

Danylo Halytsky Lviv National Medical Univer
Department of Pathological Physiology

First Vice-Rector on scientific

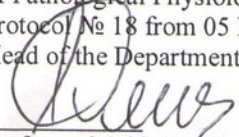


Working curriculum on Pathological Physiology
for training the specialists of the second (master's) level of higher education
Knowledge Areas 22 "Health"
Specialty 222 "Medicine"

"PATHOLOGICAL PHYSIOLOGY"

OK-17

Discussed and approved
at the session of the department
of Pathological Physiology
protocol № 18 from 05 May 2023
Head of the Department of Pathological Physiology


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Approved

by the profile methodical commission
from dental disciplines
protocol № 3 from 25 May 2023
Head of the profile methodical commission


Professor Aleksandr Lutsyk

2023



Working curriculum of discipline of **pathological physiology**

for students of the 3 **course** of the medical department of English-speaking students,

who study in specialty **222 Master of Medicine**

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(indicate the authors, their positions, degrees and academic titles)

based on the approximate Pathophysiology program of discipline and curriculum approved by the profiled methodical commission (date of approved) (report № 3 from 25.06.2023)

Changes and additions to the curriculum program for 2023-2024.

№	Contents of the changes made (additions)	Date and No. of the session of the department	Notes
		№ 18 from 05 of May 2023	

Department of Pathological Physiology
Speciality 222 – Master of medicine
The Curriculum structure on the Pathological Physiology

Introduction

Programme of «Pathological physiology»

Made according to high education standard project of Ukraine of second(material) level of high education of Branches of knowledges 22 «Health care» speciality222 «Medicine» scientific program *master of medicine*

Annotation

Psychophysiology is one of the fundamental disciplines in high pharmaceutical education system. Psychophysiology learns etiology and pathogenetic basis of diagnostic,treatment and prevention of diseases.It shows about significant role of this subject. It is theoretical base of practical medicine.This science contributes of formation in students of pathogenetical thinking.

Cours of pathological physiology consists of three parts: general nosology, typical pathological proceses, psychophysiology of organs and systems. First part contains of general position about disease study, etiology, pathogenesis, explains the essence of pathological action of environmental factors.Second part predicts learning of general regularities of functional and structural disturbances which are developed due to pathogenic factors action. Third part gets acquainted with general regularities of different organs and system development which are widespreded in clinical practice.

During proceses of psychophysiology learning students get of knowledges about disease, etiology, pathogenesis, symptoms of typical pathological disturbances, disorders of organs and systems and about of etiological and pathogenetical bases of diseases treatment and prevention.

Types of tuitional action of students are lectures, practical classes and individual work.

Cours of lectures binds the most important theams from this discipline.Practical classes predicts work of student under the supervision of teacher and include making of investigations, solving of situation tasks. Results of work are processed and made in protocol. For self- preparation are topics which don tbelong to tuitional process but are predicted of programme and have significant value for specialist preparation.

Volume of workload is described in ECTS credits which are credited for students if they passes of credit successfully.

Department of Pathological Physiology
for students of Medical Faculty
Speciality 222" Master of Medicine", qualification - the medical doctor
The Curriculum structure on the Pathological Physiology

curriculum structure of the discipline	Number of hours, including				Course/Year of study	Type of control
	Total hours/ credits ECTS	Auditory		Students' individual work		
		Lecturs	Practical classes			
					3-d	
Credits ECTS						Credit /exam
Module (exam)pathophysiology: Mini modules 7	210 hours7,0 credits	34	70	106	3-d	credit
Mini modules 1-3	108 hours/ 3,2 credits	16	30	50		
Mini modules 4-7	102 hours/ 3,8 credits	18	40	56	3-d	exam

The subject of the study of pathological physiology is the general laws of the functioning of sick organism. Which arise at the level of cells, organs, systems and organism of the patient as a whole, and determine the mechanisms of origin, development and completion and consequences sick

organism.

Interdisciplinary connections:

1. Pathophysiology as an educational discipline is based on the study of students of biology with the basics of genetics, biological physics, biological chemistry, inorganic chemistry, physiology, anatomy, pharmacology and integrates with these disciplines. It makes the idea of the general laws of the origin, development and cessation of various disorders of the body's vital functions. It is base for studying pharmacotherapy.

1. Methods and aims of pathophysiology

Pathophysiology aim is a formation of deep theoretical knowledge and practical skills about basic concepts of general nosology, the role of destructive (destructive) and protective-compensatory mechanisms of different disease. Analysis of typical pathological processes and their general patterns of development. Ability to appreciate of harmful effects unsystemic and well-grounded use of drugs.

1.2. The main aimes of Pathophysiology; is a study problems of general pathology (general knowledge about disease, general etiology, general pathogenesis, etc.) and special pathophysiology (study about pathophysiological mechanisms development of diseases and syndromes), which contributes to solving problems of prevention, diagnosis and treatment of certain nosological forms..

1.3. Competence and learning outcome

Competence and learning outcomes the formation of which is facilitated by the discipline "Pathological Physiology" (the relationship with the normative content of the training of higher education graduates, formulated in terms of the results of training in the Standard of Higher Education).

Integral competence: In accordance with the requirements of the Standard of Higher Education, discipline ensures students' acquisition of competences

3K1 — 3K12, ФK1, 2, 3, 7, 8, 11, 17, 21

The ability to solve complex problems, including those of a research and innovation nature in the field of medicine. Ability to continue learning with a high degree of autonomy.

General competences according to requirements of NRC

3K1	Ability to abstract thinking, analysis and synthesis.
3K2	The ability to learn and master modern knowledge.
3K3	Ability to apply knowledge in practical situations.
3K4	Knowledge and understanding of the subject field and understanding of professional activity.
3K5	Ability to adapt and act in a new situation.
3K6	Ability to make informed decisions.
3K7	Ability to work in a team.
3K8	Ability to interpersonal interaction.
3K9	Ability to communicate in a foreign language.
3K10	Ability to use information and communication technologies.
3K11	Ability to search, process and analyze information from various sources.
3K12	Determination and persistence in relation to assigned tasks and assumed duties

Professional competences according to requirements of NRC

ФK1	Ability to collect medical information about the patient and analyze clinical data.
ФK2	Ability to determine the necessary list of laboratory and instrumental studies and evaluate their results.

ΦK3	Ability to establish a preliminary and clinical diagnosis of the disease.
ΦK6	Knowledge and understanding of the subject field and understanding of professional activity.
ΦK7	Ability to diagnose emergency conditions
ΦK8	Ability to determine tactics and provide emergency medical care
ΦK11	The ability to solve medical problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility
ΦK17	The ability to assess the impact of the environment, socio-economic and biological determinants on the state of health of an individual, family, population .
ΦK21	Clearly and unambiguously convey one's own knowledge, conclusions and arguments on health care problems and related issues to specialists and non-specialists, in particular to students
ΦK24	Compliance with ethical principles when working with patients and laboratory animals.
ΦK25	Observance of professional and academic integrity, bear responsibility for the reliability of the obtained scientific results

Determination of competencies in accordance with the descriptors of the NRC in the form of "Matrix of competencies"

Matrix of competencies

№	Competencies		Knowledge	Ability	Communications	Autonomy and responsibility
1.	3K1	Ability to abstract thinking, analysis and synthesis.	Know the methods of analysis, synthesis and further modern education	Be able to analyze information, make informed decisions, be able to acquire modern knowledge	Establish appropriate connections to achieve goals.	To be responsible for the timely acquisition of modern knowledge
2.	3K2	The ability to learn and master modern knowledge.	Know standard methods, including modern computer information technologies, processing of state, social and medical information	The ability to determine the source of finding the required information depending on its type; ability to perform statistical processing of material and analysis of received information	Form conclusions based on the analysis and statistical processing of the received information	Be responsible for high-quality and timely performance of statistical processing and analysis of received information
3.	3K3	Ability to apply knowledge in practical	Have specialized	To be able to solve	Clear and unambiguous	Be responsible for making decisions

		situations.	conceptual knowledge acquired in the learning process.	complex tasks and problems that arise in professional activity.	delivery of one's own conclusions, knowledge and explanations, which justify them to specialists and non-specialists.	in difficult conditions
4.	3K4	Knowledge and understanding of the subject field and understanding of professional activity.	Have in-depth knowledge of the structure of professional activity.	To be able to carry out professional activities that require updating and integration of knowledge.	The ability to effectively form a communication strategy in professional activities	To be responsible for professional development, the ability for further professional training with a high level of autonomy.
5.	3K5	Ability to adapt and act in a new situation.	Know the methods of self-regulation, conducting training and performing professional duties.	To be able to apply means of self-regulation, to be able to adapt to new situations (circumstances) of life and activity.	Establish appropriate connections to achieve results ■	To be responsible for the lifestyle and timely use of self-regulation methods ■
6.	3K6	Ability to make informed decisions.	Know the methods of evaluating performance quality indicators.	Be able to ensure quality performance of work ■	Establish relationships to ensure quality performance of work.	To be responsible for quality performance of works.
7.	3K7	Ability to work in a team.	To know communication tactics and strategies, laws and methods of communicative behavior	Be able to choose communication methods and strategies to ensure effective teamwork	Use communication strategies and interpersonal skills	To be responsible for the choice and tactics of the method of communication
8.	3K8	Ability to interpersonal interaction.	Know the tactics and strategies of communication, laws and methods of communicative behavior for conducting fruitful	Be able to choose methods and strategies of communication to ensure effective interpersonal interaction	Use communication strategies and interpersonal skills	To be responsible for the choice and tactics of the method of communication

			interpersonal interaction			
9.	3K9	Ability to communicate in a foreign language.	Have perfect knowledge and basic knowledge of a foreign language	Be able to apply knowledge of a foreign language, both orally and in writing.	Use a foreign language in professional and business communication and when preparing documents. Use a foreign language in professional activities	Be responsible for fluency in a foreign language, for the development of professional knowledge.
10.	3K10	Ability to use and information communication technologies.	Have deep knowledge in the field of information and communication technologies used in professional activities	To be able to use information and communication technologies in a professional field that requires updating and integration of knowledge.	Use information and communication technologies in professional activities	To be responsible for the development of professional knowledge and skills.
11.	3K11	Ability to search, process and analyze information from various sources.	Have deep knowledge in the field of information and communication technologies used in professional activities	To be able to use information and communication technologies in a professional field that requires updating and integration of knowledge.	Use information and communication technologies in professional activities	To be responsible for the development of professional knowledge and skills.
12.	3K12	Determination and persistence in relation to assigned tasks and assumed duties	Know the responsibilities and ways of performing assigned tasks	To be able to determine the goal and task, to be persistent and conscientious in the performance of duties	Establish interpersonal relationships for effective performance of tasks and responsibilities	To be responsible for the high-quality performance of assigned tasks

13	ΦK1	Ability to collect medical information about the patient and analyze clinical data.	To know the basic methods and points necessary for a complete collection of the patient's history, to be able to communicate	Be able to ensure quality performance of work.	Be able to quickly communicate with different patients regardless of age, gender	To be responsible for quality performance of works.
14	ΦK2	Ability to determine the necessary list of laboratory and instrumental studies and evaluate their results.	Know the basic laboratory and instrumental medical research for various pathologies	To be able to determine the immediate and most necessary research methods for the patient in view of the main symptoms	Be able to quickly communicate with different doctors	Be responsible for making a preliminary diagnosis and choosing the necessary research for the patient
15	ΦK3	Ability to establish a preliminary and clinical diagnosis of the disease.	Know the main methods for establishing a preliminary and clinical diagnosis	Be able to ensure quality performance of work.	Establish the main symptoms and syndromes, determine preliminary and diagnosis by etiology, pathogenesis, clinical manifestations, connections to ensure quality performance of work.	To be responsible for quality performance of works.
16	ΦK6	Knowledge and understanding of the subject field and understanding of professional activity.	To know the basic methods of evaluating tactics and providing medical assistance to the patient, to have basic knowledge of prevention methods.	Be able to ensure quality performance of work.	Establish relationships to ensure quality performance of work.	To be responsible for quality performance of works.
17	ΦK7	Ability to diagnose emergency conditions	Know the methods of evaluating performance quality indicators. In	Be able to ensure quality performance of work.	Establish relationships to ensure quality performance of work.	To be responsible for quality performance of works.

			emergency situations			
18	ΦK8	Ability to determine tactics and provide emergency medical care	Know the main methods of evaluating tactics and providing emergency medical care .	Be able to ensure quality performance of work	Establish relationships to ensure quality delivery of emergency medical care	To be responsible for quality performance of works.
19	ΦK11	The ability to solve medical problems in new or unfamiliar environments in the presence of incomplete or limited information, taking into account aspects of social and ethical responsibility	Know standard methods, diagnostics and treatment, including modern computer information technologies, processing of state, social and medical information	The ability to determine the source of finding the required information depending on its type; ability to perform statistical processing of material and analysis of received information	Form conclusions based on the analysis and statistical processing of the received information	Be responsible for high-quality and timely performance of statistical processing and analysis of received information
20	ΦK17	The ability to assess the impact of the environment, socio-economic and biological determinants on the state of health of an individual, family, population .	To know the problems of preserving the environment and ways of preserving it	To be able to form requirements for oneself and others regarding the preservation of the environment	Make proposals to relevant bodies and institutions regarding measures to preserve and protect the environment	To be responsible for the implementation of environmental protection measures within the framework of one's competence.
21	ΦK21	Clearly and unambiguously convey one's own knowledge, conclusions and arguments on health care problems and related issues to specialists and non-specialists, in particular to students	Know standard methods, including modern computer information technologies, processing of state, social and medical information	The ability to determine the source of finding the required information depending on its type; ability to perform statistical processing of material and analysis of received information	Form conclusions based on the analysis and statistical processing of the received information	Be responsible for high-quality and timely performance of statistical processing and analysis of received information
22	ΦK24	Compliance with ethical principles when working	Adherence to ethical	Be able to ensure	Management of work with	To be responsible for quality

		with patients and laboratory animals.	principles when working with patients and laboratory animals.	quality performance of work ■	patients and animals by the basic rules of ethical principles.	performance of works.
23	ΦK25	Observance of professional and academic integrity, bear responsibility for the reliability of the obtained scientific results	Adhere to professional and academic integrity, bear responsibility for the reliability of the received scientific data ■	Be able to ensure quality performance of work ■	To be guided by professional and academic integrity in the work, to be responsible for the reliability of the received scientific data ■	To be responsible for quality performance of works.

Results of studying processes:

- creation of theoretical foundations for students to master clinical disciplines (internal medicine, surgery, obstetrics and gynecology, clinical pharmacology, pediatrics, anesthesiology, etc.), which involves both the integration of teaching with the main clinical disciplines and the acquisition of in-depth knowledge of pathophysiology, the ability to use this knowledge in the process of further education and in the professional activity of the doctor;
- formation of methodological basic clinical thinking;
- ensuring the possibility of pathophysiological analysis of clinical situations for the purpose of further diagnosis, treatment, and prevention of diseases.

Integrative and final results studying processes: ΠP3 4, ΠP3 5, ΠP3 6, ΠP3 7, ΠP3 8, ΠP3 24, ΠP3 25

ΠP3 4	Identify and identify leading clinical symptoms and syndromes, using standard methods using preliminary anamnesis data, patient examination data, knowledge about a person, his organs and systems, establish a preliminary clinical diagnosis of the disease.
ΠP3 5	Collect complaints, life and disease history, assess the psychomotor and mental development of an adult patient and child, the state of organs and systems of the body based on the results of laboratory and clinical studies, evaluate information about the diagnosis, taking into account the age of the patient.
ΠP3 6	To establish the final clinical diagnosis by making a reasoned decision and analyzing the received subjective and objective data of clinical and additional examination, carrying out differential diagnosis, observing the relevant ethical and legal norms, under the control of the head doctor in health care institutions.
ΠP3 7	Assign and analyze additional methods of examination of patients with diseases of organs and systems of the body for differential diagnosis.
ΠP3 8	Determine the main clinical symptoms and syndromes, or what causes the severity of the condition (according to list 3); the victim by making a reasoned decision and assessing the person's condition under any circumstances, including in emergency situations and combat operations, in field conditions, in conditions of lack of information and limited time.
ΠP3 23	Assess the impact of the environment on human health to assess the morbidity of the population.
ΠP3 25	It is clear and unambiguous to convey one's own knowledge, conclusions and arguments on health care problems and related issues for specialists and non-specialists

- Students must know after completing a discipline:
 - General knowledge about nosology
 - Negative influence reactivity, hereditary and constitution, age in the mechanisms of disease development
 - Course and mechanisms of development typical pathological processes
 - Causes and mechanisms of development of typical metabolic disorders
 - Quantitative and qualitative changes in blood system cells
 - Major disorders of the cardiovascular system, respiratory system, digestion, liver, kidneys
- Causes and mechanisms of violations of regulatory systems (endocrine and nervous)

be able:

- be able to explain the causes, mechanisms of development and manifestations of typical pathological processes and the most common diseases
- to analyze, make conclusions about the causes and mechanisms of functional, metabolic, structural disorders of organs and systems of the body in diseases

2. Information volume of educational discipline

210 hours / 7 credits of ECTS are allocated for the study of the discipline

Structure of subject:

- Content module 1. General nosology.
- Content module 2. Typical pathological processes
- Content module 3. Pathology of metabolism.
- Content module 4 Pathology of blood system.
- Content module 5. Pathology of circulatory system and external respiration
- Content module 6. Pathophysiology of the digestive system liver and kidneys.
- Content module 7. Pathophysiology of endocrine, nervous systems and extremal states

Contents of subject:

Topic 1. Subject and tasks of pathophysiology.

Pathophysiology of science. Place the pathophysiology of the system of medical knowledge. The role of the achievements of molecular biology, genetics, biochemistry, physiology, immunology and other sciences in the development of modern pathophysiology. The value of the pathophysiology of clinical and preventive medicine. Clinical pathophysiology.

The pathophysiology as an academic discipline and its components: general pathology, pathophysiology organs and systems. Place pathophysiology doctor in training.

Methods of pathophysiology. Experimental modeling of pathological processes (diseases) - the main method of pathophysiology - its possibilities and limitations. Modern methods of the experiment, the rules of experimental animals. The experimental therapy. Methods of clinical pathophysiology.

History of pathophysiology. The value of scientific works K. Bernard, R. Virchow, J. Konheyma, Mechnikov, V. Pashutina, H. Selye and other prominent researchers.

Native school pathophysiologists (NA Hrzhonshevskyy, VV elevated constables, VK Lindeman, AA Bogomolets, MM Sirotnin, AV Reprov, DO Alpern, VA Vladimir Voronin, M. Zayko). Scientific school of pathophysiology, basic directions of activity.

Topic 2. General theory of disease etiology and pathogenesis.

Concepts nosology: norm (WHO), the disease, the pathological process typical pathological process, pathological reaction, a pathological condition.

The disease as a biological, medical and social problem. Abstract and concrete in the concept of "disease".

Principles Classification of Diseases, WHO classification. Basic laws and periods of illness. Options completion diseases.

The concept of terminal states (agony, clinical death) and biological death. The pathophysiological bases of resuscitation.

The main directions of teaching about disease, humoral (Hippocrates), solidarity (Democritus) of cellular (R. Vikhrov). The development of these areas today.

The definition of "etiology". The problem of causality in pathology, the current state of its solution. Modern understanding of the causal factors, risk factors, and conditions of diseases.

The main directions of development of the doctrine of etiology: monokauzalizm, kondytsionalizm, constitutionalism, psycho-somatic concept and others. Modern ideas of causality in pathology.

Classification of etiologic factors. External and internal etiologic factors. Environmental, genetic, storage battery and ontogenetic concepts of human diseases.

Causal principle of treatment and prevention of diseases.

The definition of "pathogenesis". Pathological (destructive) and adaptive-compensatory (protective) effects in the pathogenesis. Manifestations of damage at different levels: molecular, cellular, tissue, organ, at the level of the whole organism.

Protective adaptive response. Adapting compensation. Mechanisms of immediate and long-term adaptation. The role of neural and humoral factors in their implementation.

Causal relationships and their variants "circulus vitiosus". The concept of "main link" of pathogenesis. The phenomena of local and general, specific and non-specific in pathogenesis. Unity structural changes and functional manifestations of the disease.

Pathogenetic principle of classification and treatment of disease.

Topic 3. Pathogenic effect of physical factors.

Pathogenic effect of mechanical factors. Patterns of mechanical trauma, crush syndrome, traumatic disease.

Pathogenic effect of thermal factors. Protective and compensatory reaction in fact pathological changes in hyperthermia. Heat and sunstroke. Burns, burn disease. Hypothermia. Protective and compensatory reaction in fact pathological changes. Mechanisms of long-term adaptation to cold. Artificial hypothermia, its use in medicine. The local effect of low temperatures, frostbite.

Pathogenic effect of radiant energy. Types of ionizing radiation. Radio - sensitivity tissues. Direct and indirect mechanisms of radiation damage to biological structures. Radiolysis of water. Radiotoxins. The manifestations of radiation injury at the molecular, cellular, tissue, organ and system levels. The pathogenesis of radiation sickness, its basic forms and syndromes. Short and long-term consequences of large and small doses of ionizing radiation. Natural radiation protection mechanisms. The pathophysiological bases radioprotections.

Pathogenic effect of infrared and ultraviolet rays. Photosensitivity. The risk of insufficient insolation. Lesions caused by electromagnetic radio waves of ultrahigh frequency range.

Pathogenic effect of electric current. Factors that determine the character of lesions in this.

Effects on the body of high and low atmospheric pressure. Cause-effect relationship in the pathogenesis of syndromes compression and decompression. Explosive decompression.

The impact on the body of space flight factors - acceleration, weightlessness.

Topic 4. Pathological effect of chemical factors.

Chemical pathogenic factors as the problem of ecology and medicine. The concept of toxicity, carcinogenicity and TERATOGENICITY chemicals.

And exogenous endogenous intoxications. The general laws of poisons, specific and non-specific mechanisms of toxicity. The natural mechanisms of protection against toxins and poisons.

Pathophysiological aspects of alcoholism, drug addiction, substance abuse.

Topic 5. Pathological effect of biological factors.

Infection, the general laws of development. Classification of infectious agents. Protective barrier against infection, the conditions to overcome them. Distribution and dissemination of infectious agents in the body. Sepsis. The role of pathogen properties and reactivity in the development of infectious diseases.

Topic 6. The role of heredity, constitution, age-related changes in pathology.

Heredity and conditions as the cause of disease. Value of hereditary and acquired in pathogenesis. Hereditary and congenital diseases. Genome and Phenocopy. The classification of hereditary diseases.

Mutations. The principles of classification. Types of mutations. The causes of mutations. Mutagenic factors of physical, chemical and biological origin. Protection systems. The mechanisms of DNA repair. The role of reparative violations and "immune surveillance" in causing hereditary diseases.

Monogenic hereditary disease. Characteristics of monogenic diseases by abnormal gene mode of inheritance: 1) classically inherited Mendel (autosomal dominant and -retsesyvni, kodominantni, linked to sex); 2) inherited not classically (caused by triplet repeats, mitochondrial, in violation of genomic mutation). Manifestations of harmful gene mutations at the molecular, cellular, organ level and at the level of the whole organism. Molecular and biochemical basis of pathogenesis classical monogenic diseases, defects in enzymes, receptors and transport systems; defects in the structure, function or number non (structural nonenzymatic) proteins, and defects in proteins that regulate cell division (family cancer). General understanding of the pathogenesis of monogenic diseases with non-classical inheritance (caused by gene amplification - a syndrome of fragile X chromosome, mutations in mitochondrial genes or genomic violation).

Polygenic (multifactorial) diseases. Hereditary predisposition to disease.

Chromosomal diseases. Mechanisms of gene mutations and chromosomal them. Polyploidy, aneuploidy, deletion, duplication, translocation, inversion. Syndrome caused by a change in chromosome number. The main phenotypic expression of chromosomal aberrations.

The methods of diagnosis, prevention and treatment of hereditary diseases. By correcting genetic defects. Prospects for genetic engineering.

The Constitution and its role in pathology. Classification constitutional types by Hippocrates, Siho, Sheldon, Kretschmer, IP Pavlov,

OO Worshipers. Anomalies of constitution as a risk factor for the emergence and development of disease.

The concept of antenatal pathology. Hameto-, blasto-, embrio- and fetopatya. Teratogenic factors. Critical periods in the antenatal ontogenesis. Prenatal hypo- and hypertrophy. Intrauterine infection and hypoxia. Pathology placental circulation.

Diseases and habits of the mother as causal factors or risk factors and the development of fetal pathology.

Aging. Factors determining the species, and individual life expectancy. General features and patterns of aging. Structural, functional and biochemical signs of aging at the molecular, cellular, tissue, organ, system level and at the level of the whole organism. Theories of aging. Aging and disease. Progeria. The theoretical basis lengthening life expectancy. Methods heroprotektions.

Topic 7. Pathology reactivity. Violation of immune reactivity.

Reactivity as a condition of diseases. Manifestations reactivity at the molecular, cellular, tissue, organ, system level and at the level of the whole organism. Species reactivity. The dependence of the reactivity of gender, age, heredity, the immune, nervous and endocrine systems. The impact of environmental factors on reactivity.

The concept of resistance. Passive and active resistance. Contact resistance of reactivity. Non-specific resistance mechanisms. Biological barriers, their classification, value in resistance of the organism. The role of the physiological system of connective tissue in the resistance to the action of pathogenic agents (OO Bogomolets). Phagocytosis. Violation of phagocytosis, causes, mechanisms, consequences.

Humoral factors of nonspecific resistance to infectious agents. The complement system and its disorders.

The mechanisms of the immune response of humoral and cell-type mechanisms of immunological tolerance, its types and playback experiment. The general patterns of immune system disorders, hyper-, hypo- and immune system dysfunction. Experimental modeling pathologies of the immune system. Immune deficiency, definition, classification (WHO). Causes, mechanisms of development, types of primary immunodeficiency's. The role of physical, chemical and biological factors in the development of secondary immunodeficiency (immunosuppressive) states. Pathogenesis of clinical manifestations of immune deficiency. Etiology, pathogenesis of acquired immunodeficiency syndrome (AIDS).

The pathophysiological bases of transplantation of organs and tissues. The reaction of transplant rejection, its causes and mechanisms. The reaction "graft versus host".

Immunological relationships in the system "mother-fetus".

Basic principles immunostimulation immunosuppression.

Violation of functionally related to the immune system: a violation of the complement system, violations of phagocytosis and biologically active substances.

The role of cytokines system in pathogenesis of Covid-19. Definition of "cytokine storm".

Pecularity of cours of covid-19 depend on state of reactivity.

Topic 8. Allergy.

The definition and general characteristics allergies. The etiology of allergies kinds of exogenous and endogenous allergens. Formation of allergic reactions depending on the condition of the body. The value of inherited and acquired factors in the development of allergies.

Principles of classification of allergic reactions. General characteristics of allergic reactions immediate and delayed types. Classification of allergic reactions Coombs and Jelly. Stages of pathogenesis of allergic reactions.

Anaphylactic reactions: experimental model, the main clinical forms. Immunological mechanisms of anaphylactic reactions, tissue basophils role in their development. Active and passive anaphylaxis, anaphylactic shock pathogenesis.

Cytotoxic reactions: experimental simulation, the main clinical forms. Mechanisms cytotoxicity: complement- cytotoxicity, antibody-body response phagocytosis, antibody-cell cytotoxicity. The role of complement activation products and the development of cytotoxic reactions.

Immunocomplex reactions: playing in the experiment, the main clinical forms. Factors that determine the pathogenicity of immune complexes. Immunocomplex damage their local and general symptoms.

The cell reaction (hypersensitivity reaction of delayed type): experimental reproduction, main clinical forms. Features immunological mechanisms. The role of lymphokines.

Allergic reactions stimulating and brake type, clinical forms.

Pseudoallergic reaction.

Auto allergic (autoimmune) reactions. The causes and mechanisms of development. Role of auto allergic component in the pathogenesis of diseases.

Basic principles of prevention and treatment of allergic reactions. Hyposensibilisation. Correlation between allergy, immunity and inflammation.

SARS animal models.

Experimental ways of vaccine creation against Coronavirus.

Topic 9. Practical skills on "General nosology. Pathogenic effect of environmental factors. The role of internal factors in pathology. "

1. To carry out the analysis:

- Basic concepts of general nosology (health, illness, disease process, typical pathological process, pathological reaction, pathological condition, etiology, pathogenesis).
- Basic concepts of etiology (causal factors, risk factors, and conditions of developing the disease).
- Mechanisms of pathogenic action of physical, chemical and biological factors of the environment.
- Causation (highlight changes in local and general, pathological and adaptive-compensatory, specific and non-specific, identify top link) in the pathogenesis manifestations / effects of environmental factors (mechanical trauma, overheating, cooling, burns, frostbite, radiation illness, disease, decompression and compression).
- The causes and mechanisms of typical symptoms and principles of diagnosis of hereditary diseases and disorders of fetal development.
- Model disorders of the immune system.
- Mechanisms of immune damage cells / tissues / organs (by Coombs and Jhelum).

2. Ability and practical skills:

- Solving situational problems with determining causal factors, risk factors, the main pathogenesis, neurotransmitters, clinical manifestations, principles of care in states immune deficiency, allergies, autoimmune diseases and with pseudo allergic reactions.
- Schematic display mechanisms of immune damage (by Coombs and Jhelum).
- Research stages of phagocytosis in peritoneal fluid smears.

Typical pathological processes

Specific goals:

- Define the concept of typical pathological processes, cell damage, local blood circulation and microcirculation disorders, inflammation, cancer, fever, hypoxia, starvation and more.
- Use existing guidelines for the classification of typical pathological processes.
- To analyze violations of the structure, function and metabolism of the cells in the pathogenesis of cellular damage.
- Analyze cause and effect relationships in the pathogenesis of typical pathological processes, while able to separate changes in local and general, pathological and adaptive-compensatory.
- To analyze the mechanisms of cell damage in the pathogenesis of typical pathological processes.
- Apply the necessary methods for modeling and experimental study of typical pathological processes.
- Apply the necessary methods for modeling and experimental study of typical pathological processes.
- Explain the general biological significance of typical path• To analyze violations of the structure, function and metabolism of the cells in the pathogenesis of cellular damage.
- Analyze cause and effect relationships in the pathogenesis of typical pathological processes, while able to separate changes in local and general, pathological and adaptive-compensatory.
- To analyze the mechanisms of cell damage in the pathogenesis ological processes, their role in disease, particularly in the occurrence and development of the group of diseases.

Topic 10. Pathophysiology cells. Damage to the cell.

Characteristics of the concept of "damage". Principles of classification of cell damage. Structural, functional, physical, chemical, biochemical and thermodynamic signs of cell damage. Exogenous and endogenous causes cell damage, hypoxia, action of physical, chemical, infectious agents, immune response, genetic defects.

Characteristics of universal mechanisms of cell damage:

- O₂-dependent (the effect of oxygen and its derivatives - free radicals that cause peroxidation of molecules, primarily lipid membrane phospholipase activation, detergent action lisophospholipids and free fatty acids);
- calcium mechanism (increase of free calcium in the cells, activation of phospholipases, proteases, endonucleases);
- ATP deficiency caused by primary or impaired membrane permeability and, consequently, electrolytic-osmotic mechanism of injury;
- due to the development of intracellular acidosis;
- caused by activation of proteolysis, protein denaturation;
- disturbances caused by genetic apparatus of the cell.

Mechanisms and manifestations of damage to subcellular structures. The effects of cell damage. Necrosis and apoptosis, their characteristic features. Exogenous and endogenous inducers of apoptosis. Mechanisms of apoptosis.

Mechanisms of protection and adaptation of cells to the action of harmful agents. Cell stress proteins.

Topic 11. Typical violations of peripheral circulation and microcirculation.

The main forms of peripheral circulatory disorders, arterial and venous hyperemia, ischemia, stasis. types, causes and

mechanisms of development, external displays. The role of endothelial factors in the pathogenesis of local circulatory disorders. Changes in the tissues caused by disorders of local circulation, their significance and possible consequences. The concept of reperfusion syndrome, ischemic toxicosis.

Thrombosis and embolism as the cause of local blood circulation disorders. The causes and conditions of thrombosis. Types of emboli mechanisms embolism. The role of reflex mechanisms in the development of common disorders caused by embolism. Peculiarities embolism large and small circles of blood circulation, the portal vein.

Typical violations of microcirculation. Intravascular violation. Sludge syndrome. The syndrome of disseminated intravascular coagulation. Capillary (true) stasis. Violation tone, mechanical integrity and micro vascular permeability. Extravascular microcirculation abuse. Capillary form failure.

Typical errors lymph. Mechanical, dynamic lack of lymph circulation.

Topic 12. Inflammation

Definition of inflammation. Classification of inflammation (immune, immune, infectious, non-infectious, acute, chronic, norm-, hypo-, hyperergic, et al.). Etiology of inflammation: classification and characterization flohogenic factors. General and local signs of inflammation.

The pathogenesis of acute inflammation. Stages of inflammation. Alteration (primary and secondary), the causes and mechanisms of secondary alteration.

Biochemical and physico-chemical disturbances in the inflammation.

Mediators of inflammation, their classification. Plasma mediators (acute phase proteins, proteins of the complement, coagulation / anti-coagulation, fibrinolysis, kinin).

Mediators cell origin, specific and nonspecific.

Cytokines: types, characteristics action. Mediators of tissue basophils. Eicosanoids.

Violation of local blood circulation in the focus of acute inflammation. Experiment Yu Konheyma. The pathogenesis of ischemia and arterial hyperemia. Reasons to go arterial venous congestion. Changes in the rheological properties of blood cell acute inflammation.

Exudation at the site of acute inflammation, causes and mechanisms. Characteristics of exudates.

The emigration of leukocytes in inflammation. Stages, causes and mechanisms of leukocyte migration. Adhesion molecules of leukocytes and endothelial cells. The causes and mechanisms of leukocyte chemotaxis. Mechanisms of neutralization of microbes leukocytes. Phagocytosis, stage mechanisms of destruction facilities phagocytosis.

Proliferation at the site of inflammation - regeneration and / or fibroplasia. The causes and mechanisms of proliferation.

Mitogenic signals (growth factors, cytokines, hormones, lack of contact inhibition of cell proliferation). Transfer mitogenic signal intracellular signaling pathways. Role mitogen active protein to stimulate cell division. Mechanisms sclerosis, scar organization.

Chronic inflammation. General characteristics, features local and systemic manifestations (in comparison with acute inflammation). Features pathogenesis (mononuclear infiltration, repair / fibrosis, granuloma formation).

The role of reactivity, abnormal immune response in the development of inflammation (norm-, hypo-, hyperergic inflammation).

The principles of anti-inflammatory therapy.

The role of monocyte and macrophages in SARS-Covid development.

Acute-phase proteins violation in development of acute response in Coronavirus infection.

Topic 13. Fever

Definition. Overview of fever.

Etiology of fever. Characteristics of pyrogens. Primary and secondary pyrogens. The formation of pyrogens during infection, aseptic damage and immune reactions. The chemical nature and origin of secondary ("real") pyrogens.

Mechanisms of the thermoregulation center. Stages of fever.

Principles of classification of types of fever. Participation nervous, endocrine and immune systems of fever. Changes in metabolism and functions in organism during fever. The protective value and pathological manifestations of fever.

Pathophysiological principles of antipyretic therapy. The concept of pyrotherapy. The main differences between fever exogenous overheating and other forms of hyperthermia.

Topic 14. Tumors.

General characteristics of the main types of disorders of tissue growth (hypoplasia, hyperplasia).

Definitions "tumor" and "tumor process." General manifestation of tumor growth. Molecular genetic basis of unlimited growth and potential immortality of tumor cells. Anaplasia: manifestations of structural, functional, physical, chemical, biochemical, antigenic anaplasia. Characteristics expansive and infiltrative (invasive) tumor growth. Principles of classification of tumors.

Experimental study of etiology and pathogenesis of tumors: induction techniques, transplantation, explantation.

The etiology of cancer. Physical, chemical and biological carcinogenic factors. Properties carcinogenic factors that determine their carcinogenic effects.

Risk factors (genetic / chromosomal defects and abnormalities of the Constitution) and the conditions for the emergence

and development of tumors.

The physical carcinogenic factors. Basic laws ionizing radiation and ultraviolet rays.

Chemical carcinogens, their classification. Exogenous and endogenous carcinogens. Chemical carcinogens direct and indirect action. Features of the chemical structure of the compounds that determine their carcinogenicity. Kokancerogenez and synkancerogenezis.

The biological carcinogenic factors: plant (tsykadyn), fungi (aflatoxin) viruses. Classification of oncogenic viruses.

Viral carcinogenesis. Experimental evidence of viral origin tumors.

The pathogenesis of tumor growth. Stages of pathogenesis: initiation, promotion and progression.

Phase transformation (initiation). Damage and cellular mechanisms regulating the division as the main event of malignant transformation. Mutation and epigenetic mechanisms of malignant transformation. Violations of system genes that provide cell division. The concept of protooncogenesis, oncogenes (cellular, viral), suppressor genes, cell division. Methods for transformation protooncogens oncogene. Types onkomarkers. The role of apoptosis in the pathogenesis of tumor growth. The concept of apoptosis inducers and suppressors. Mechanisms of evasion of transformed cells from apoptosis. Phase promotion. Mechanisms of promotion. Description of the promoters of tumor growth (hormonal influences, chemicals, chronic irritation, etc.).

The stage of progression. The mechanisms of tumor progression.

The interaction of the tumor and the body. The influence of the tumor on the body. The mechanisms of cancer cachexia.

Mechanisms of antitumor natural defense immune and non-immune mechanisms of resistance. The mechanisms of tumor evasion of immune surveillance. The pathophysiological bases of prevention and treatment of tumors.

Topic 15. Starvation.

The definition, types of fasting: physiological, pathological; complete, absolute, incomplete, partial. External and internal causes of starvation. The characteristic disorders of basal metabolism and metabolism in certain periods of complete starvation with water. The pathophysiological features of partial starvation. Types, etiology, pathogenesis partial (quality) of starvation.

Protein-energy deficiency, its forms: nutritional marasmus, kwashiorkor. Alimentary dystrophy.

Factors affecting resistance to starvation.

The concept of therapeutic starvation.

Topic 16. Hypoxia.

The definition, principles of classification hypoxia. Mechanisms of hypoxia, reduce supply and violation utilization of oxygen by cells. The etiology of major types of hypoxia, hypoxic, respiratory, circulatory, blood, tissue mixed. Changing the gas composition of arterial and venous blood in different types of hypoxia. Immediate and long-term adaptation mechanisms and adaptation to hypoxia. Resistance to hypoxia. Factors that provide it. Mechanisms of hypoxic cell damage.

Modern principles of oxygen therapy. Iso and hyperbaric oxygen therapy. Toxic effects of oxygen. Hyperoxia and free radical reactions. Hyperoxia as the cause of hypoxia.

Topic 17. Practical skills on the topic "The typical pathological processes."

1. To carry out the analysis:

- Model pathological processes because of their classification, general symptoms and completion options.
- The value of typical pathological processes in the pathology, particularly in the occurrence and development of the group of diseases.
- stages in the pathogenesis of typical pathological processes.
- causation (changes in local and general, pato-lohichnyh compensatory and adaptive-specific and non-specific, leading and supporting units) in the pathogenesis of typical pathological processes.
- Types, causes, mechanisms of damage and cell death.

2. Ability and practical skills:

- Apply techniques for experimental modeling of typical violations of local circulation.
- Solving situational problems of definition stages of development, completion options, pathogenesis, mediators and mechanisms of action, clinical manifestations typical pathological processes (local circulatory disorders, inflammation, cancer and so on.).

Typical metabolic disorders

Specific goals:

- Analyze the violation of energy metabolism in the body.
- Identify the types and criteria for disorders of carbohydrate metabolism, explain their relationship with disorders of energy metabolism.
- Analyze the role of regulation disorder of carbohydrate metabolism in the pathogenesis of failures.
- Direct current (WHO) classification of diabetes characterize these types of diabetes.
- Treat the etiology of diabetes in the context of general ideas about the etiology of diseases multifactorial: analyze the relationship between pathology hereditary and environmental factors in the onset and development of diabetes of 1st

and 2nd types.

- Analyze metabolic disorders in the pathogenesis of major types (type 1, type 2) diabetes.
- Determine the nature of cause and effect relationships and their role in the pathogenesis of major types (type 1, type 2) diabetes and its complications.
- Define criteria and types of violations of protein, fat, water-electrolyte metabolism and acid-base status.
- characterize the typical causes of violations of water-electrolyte, fat and protein metabolism and acid-base status.
- Analyze cause and effect relationships in the pathogenesis of typical violations of water-electrolyte, lipid and protein metabolism and acid-base status, while characterize pathological changes and adaptive-compensatory.
- Analyze the methods of experimental modeling of typical metabolic and energy on the causes and mechanisms of emergence and development.

Topic 18. Violations energy metabolism.

The energy needs of the body. Energy balance of negative and positive causes and mechanisms of emergence and development. Basal metabolism as a factor of influence on energy balance. Pathological changes in basal metabolism: etiology, pathogenesis.

Violation of the power cells. Violation transport of nutrients across cell membranes, intracellular catabolic disorders ways. Violation of cellular respiration, the effect of the separation of oxidation and phosphorylation, its mechanisms. The value of disorders of energy metabolism in the life of cells, organs, body. The role of disorders of energy in cells damage.

Malabsorption of carbohydrates, the synthesis, cleavage and deposit glycogen, carbohydrate transport into cells. Violation of the nervous and hormonal regulation of carbohydrate metabolism.

The syndrome of hypoglycemia: types, causes, mechanisms. Pathogenesis of hypoglycemic coma.

The syndrome of hyperglycemia, types, causes and mechanisms of development.

Diabetes. The definition, classification (WHO). Experimental modeling of diabetes.

The etiology and pathogenesis of diabetes mellitus type 1. The role of genetic factors and environmental factors in its genesis and development. Pathogenesis absolute insulin deficiency, its manifestations and consequences: violation of energy, protein, carbohydrate, fat, water and electrolyte metabolism, acid-base status.

The etiology and pathogenesis of diabetes type 2. The role of genetic factors and environmental factors in its onset and development. Variations of relative insulin deficiency diabetes type 2 (secretory abuse B-cell resistance of target tissues to insulin). Manifestations and consequences relative insulin deficiency. The concept of the metabolic syndrome.

Complications of diabetes. Coma: types, causes and mechanism development, manifestations, principles of treatment. Long-term complications (macro microangiopathy, neuropathy, fetopathy al.), Their general characteristics.

Preventing the emergence and development of diabetes. Principles of therapy of diabetes. Preventing complications.

Topic 19. Violation of fat metabolism.

Violation of digestion and absorption of lipids. Disorders transport lipids in the blood. Hyper-, hypo-, dyslipoproteinemia. Dependence of dyslipoproteinemia of environmental factors (diet, diet), heredity and related diseases. Modern classification dyslipoproteinemia (primary and secondary, the phenotype LP, with high or low risk of atherosclerosis) criteria hypercholesterolemia, hypertriglyceridemia, low HDL.

Etiology, pathogenesis of primary (genetic, family) and secondary (with eating disorders, obesity, diabetes, kidney disease, hypothyroidism, cirrhosis of the liver, AIDS, under the influence of drugs) dyslipoproteinemia. The effects / complications dyslipoproteinemia. The principles and objectives of the restoration of normal lipid levels.

The definition of obesity. Types of obesity. Experimental models. The etiology and pathogenesis of obesity. Mechanisms fatty.

Characteristics of medical problems associated with obesity.

Topic 20. Violation of protein metabolism. Exchange violation and pyrimidine purine bases.

The concept of positive and negative nitrogen balance. Violation of the basic stages of protein metabolism. Azotemia, productive and retention. Violation of the blood protein, hyper-, hypo-, dysproteinemia. Violation of the transport function of blood plasma proteins. Conformational changes of protein molecules violation degradation of proteins in lysosomes and their role in disease. Inherited metabolic acids.

Gout: etiology, pathogenesis. Hyper- and hipourykemiya.

Hereditary orotacyduriya.

Topic 21. Violation metabolism of vitamins.

Types of hypo- and hypervitaminosis, their etiology and pathogenesis. Mechanisms of major clinical manifestations. Principles of correction of vitamin A deficiency.

Topic 22. Violation of water-salt metabolism.

Positive and negative water balance. Dehydration: extracellular and intracellular; hypo, iso, hyperosmolar. The causes and mechanisms of development. Protective and compensatory mechanisms.

Excessive accumulation of water in the body. Hypo-, iso and hyperosmolar hyperhidration, causes and mechanisms of development, protective, compensatory response. Extra- and intracellular hyperhidration.

The definition of "swelling", types of edema. The causes and mechanisms of edema. The theory of the pathogenesis of

edema Starling. Swelling caused by changing oncotic pressure of blood and tissue fluid. The role of vascular permeability disorders and outflow of lymph in the pathogenesis of edema. Swelling caused a delay of sodium and / or water in the body. Miksedematic swelling. Principles of treatment of edema.

Hyper- and hyponatremia. The causes and mechanisms of development. Violations caused by changes in the concentration of sodium in the extracellular fluid.

Hyper- and hypokalemia. The causes and mechanisms of development. The main manifestations of metabolic potassium ions.

Violation of phosphorus-calcium metabolism. Hormonal regulation of phospho-calcium metabolism, hyper- and hypoparathyroidism, hypo- and hypervitaminosis D, violation of secretion caltsytonini. Hipocaltsiyemic states: causes, mechanisms of development, the main manifestation. Rickets: causes and mechanisms of development, the main clinical manifestations. Principles for the prevention and treatment of rickets. The forms of rickets resistant to vitamin D. The concept of osteodystrophy.

Hypercalcemic conditions, causes and mechanisms of development. (calcification) soft tissue, metastatic, dystrophic and metabolic mechanisms.

Hypercalcemia conditions, causes and mechanisms of development. (calcification) soft tissue, metastatic, dystrophic and metabolic mechanisms. Hyper- and hypo-phosphatemiya. The causes and mechanisms of development.

Exchange violation minerals. Etiology, pathogenesis.

General characteristics disorders acid-base status (CBS). Acidosis, definition, classification, basic laboratory criteria.

Gas acidosis, causes and mechanisms of development, clinical manifestations. Nongas acidosis (metabolic, excretory, exogenous): causes and mechanisms of development, the relationship between CBS and electrolyte disturbances.

Acidosis with increased and normal anionic difference.

Alkalosis, definition, classification, basic laboratory criteria. Gas alkalosis: causes and mechanisms of development, clinical manifestations. Neongas alkalosis (excretory, exogenous): causes and mechanisms of development. The role of buffer systems of blood, ion exchange systems, of respiratory and kidney failure in the mechanisms of compensation and correction of CBS.

Pathological changes in the body in disorders of acid-base status. Principles of pathogenetic therapy of acidosis and alkalosis.

Topic 23. Practical skills on the topic: "Typical metabolic disorders."

1. To carry out the analysis:

- Model metabolic (carbohydrate, protein, fat, water and electrolyte, acid-base, the exchange of vitamins) with defined concepts, criteria and principles of classification results.
- Cause-effect relationships in the pathogenesis of typical violations of water-electrolyte, lipid and protein metabolism and acid-base status, while characterize pathological changes and adaptive-compensatory.
- etiology and pathogenesis of basic types (1st, 2nd) diabetes in the context of general ideas about multifactorial disease.
- metabolic disorders diabetes and its complications.
- Experimental models of typical metabolic causes and mechanisms of emergence and development.

2. Ability and practical skills:

- Solving situational problems with the definition of the type of metabolic disorders, their causes and mechanisms of development, clinical manifestations, possible consequences.
- Based on the results of laboratory tests to determine the typical metabolic disorders.
- Schematically give places pathogenesis in diabetes type 1 (with ketoacidosis).

Content module 4. Pathophysiology of blood system

Specific goals:

- Identify typical violations in the system of blood: changes in total blood volume, anemia, polycythemia, leukocytosis, leukopenia, hematological malignancies, typical hemostatic disorders; give criteria for these violations.
- Use existing guidelines for the classification of typical disturbances in the blood system.
- characterize causal factors, risk factors, and development conditions of typical violations in the system of blood.
- To analyze causal relationships, while able to separate pathological changes and adaptive-compensatory in pathogenesis of typical violations in the system of blood.
- Apply knowledge of the principles and classifications of anemia to analyze their implications.
- Apply knowledge of the causes and pathogenesis of anemia for their prevention and treatment.
- To analyze the mechanisms of disorders and causes cell of the "white" blood be deposited evaluate their outcomes;
- Explain the features of malignant transformation of hematopoietic bone marrow cells in acute and chronic leukemia.
- To analyze general patterns of violations of peripheral blood cell acute and chronic leukemia.
- Assess the role of genetic abnormalities and anomalies in the constitution leicogenesis.
- characterize periods of increased risk of leukemia ("peaks leukemia") in children; explain the principles of diagnosis of leukemia.
- To analyze the features of etiology, pathogenesis and treatment outcomes of leukemia in children and adults.

- Evaluate the benefits of bone marrow transplantation as the most effective treatment of leukemia.
- Identify typical disturbances in the hemostatic system.
- Explain the causes and mechanisms of disorders vascular-platelet hemostasis level.
- To analyze general patterns of occurrence, development and completion of hypo- and hyper coagulation states.
- Explain the importance general pathology ICE blood, analyze the causes and mechanisms of development, characterized by typical clinical manifestations, depending on the clinical course.

Topic 24. Pathophysiology of the blood system. Polycythemia. Anemia caused by blood loss.

Changes in total blood volume. Characteristics of hypo- and hypervolemia, causes and mechanisms of development. Hemorrhage: etiology, pathogenesis. Changes pathological and adaptive-compensatory in pathogenesis of blood loss. Manifestations and consequences of blood loss (hypovolemia, anemia, circulatory failure / shock). Principles of therapy of blood loss. The concept of posthemotransfusion reactions and complications, mechanisms of development and means of prevention.

Polycythemia: definition, types (absolute, relative, primary, secondary), etiology, pathogenesis.

Anemia: definition, clinical and hematological manifestations, principles of classification (by etiology, pathogenesis, the nature of the course, the type of erythropoiesis, regenerative ability of the bone marrow, color index, resize erythrocytes). Abnormal, degenerative and regenerative forms of erythrocytes. Etiology, pathogenesis, hematological characteristics Posthemorrhagic anemia (acute and chronic ").

Topic 25. Hemolytic anemia and anemia caused by violation of erythropoiesis.

Etiological classification (hereditary, acquired) hemolytic anemia. Characterization of causal factors of acquired hemolytic anemia. Ways to implement genetic defects in the pathogenesis of hereditary hemolytic anemia (membrano-, fermento-, Hemoglobinopathy).

Hemolysis of red blood cells, intra vascular and intracellular as mechanisms of hemolytic anemia. Typical clinical manifestations of hemolysis erythrocytes (jaundice, hemoglobinuria, ICE blood dysholiya, holelytiyaz, splenomegaly) and their possible association with the type of hemolysis. Abnormal red blood cells form specific to hereditary hemolytic anemia.

Classification of anemia associated with disorders of erythropoiesis (scarce, Dysregulatory, hypo-, aplastic et al.), General description of the causes and mechanisms of development.

Etiology, pathogenesis, typical changes in peripheral blood with iron deficiency anemia. The concept of iron deficiency anemia.

Anemia caused by lack of vitamin B, 2 and / or folic acid. Causes and mechanisms of absolute and relative deficiency of vitamin B12 and folic acid. Malignant anemia Addison-Birmera. Characteristics common disorders in the body at deficiency of vitamin B12 and / or folic acid. Hematological characteristics vitamin VB12-deficiency anemia.

Topic 26. Leukocytosis, leukopenia

Leukocytosis, principles of classification. The causes and mechanisms of redistributive jet and leukocytosis. Neutrophilic, eosinophilic, basophilic, lymphocytic and monocytic leukocytosis. The concept of nuclear developments neutrophils, its varieties.

Leukopenia, principles of classification. Causes, mechanisms of development of leukopenia, agranulocytosis (neutropenia). The pathogenesis of main clinical manifestations.

Acquired and hereditary disorders of the structure and function of leukocytes. Leukemoid reaction.

Mecanisms of leuco- and limphopenia in Coronavirus imparatment development.

Topic 27. leukemia.

The idea of Hemoblastosis, general characteristics of major groups. A leukemia tumor. Principles of classification of leukemia (acute, chronic, miyelo-, lymphomas, biphenoptical, primary, secondary).

The etiology of leukemia: characteristics factors of physical, chemical and biological nature. Mechanisms of transforming effect on the blood-forming cells of the bone marrow. Anomalies genotype and constitution as risk factors and the development of leukemia. "Peaks" of leukemia in children.

Typical patterns and characteristics of the pathogenesis of acute and chronic leukemia, abuse cellular composition of bone marrow and peripheral blood; morphological, cytogenetic, cytochemical, imunofenotypical characteristics; systemic violations in the body. The progression of leukemia, the concept of "blast crisis". Metastasis leukemia.

The principles of diagnosis and treatment of leukemia.

Topic 28. Violation of hemostasis.

General characteristics of typical disturbances in the hemostatic system.

Hemorrhagic hemostatic disorders. Lack vasculo- platelet hemostasis. Vasculopathy: types, causes, mechanisms of pathogenesis of main clinical manifestations. Thrombocytopenia: etiology, pathogenesis, mechanisms of hemostasis disorders. Thrombocytopathy. Mechanisms violations adhesion, platelet aggregation, platelet release granules.

Violation of coagulation hemostasis. The causes decreased activity of blood coagulation and increased activity antycoagulative and fibrinolytic systems. The main manifestations of violations of certain stages of blood clotting, their etiology and pathogenesis.

Trombofilic states: thrombosis, disseminated intravascular coagulation (DIC), localized intravascular coagulation.

Principles of classification DIC (the course - acute, subacute, chronic, triggered by coagulation), etiology, pathogenesis. Role in pathology.

The principles in the correction of the hemostatic system.

Mechanisms of thrombophilic syndrom in SARS- Covid development.

Practical skills on the topic "The pathology of blood."

1. To carry out the analysis:

- causation (changes in local and general, pathological and adaptive-compensatory, specific and non-specific, leading and supporting units) in the pathogenesis of typical violations in the system of blood (anemia, polycythemia, leukocytosis, leukopenia, leukemia, hemostatic disorders).
- Patterns of violations of peripheral blood cell acute and chronic leukemia.

2. Ability and practical skills:

- Solving situational problems with the definition of typical violations in the system of blood (polycythemia, anemia, leukocytosis, leukopenia, leukemia, hemostatic disorders), their main varieties (by applying knowledge of principles classifications), causes and mechanisms of development.
- Based on the results of laboratory testing (blood test) to determine the content of certain types of white blood cells in the blood, to evaluate results.
- Determine hemoglobin levels (by Sally), transfer to a unit SI; evaluate results.
- Expect color index of blood to evaluate the results.
- Identify regenerative, degenerative, abnormal cells form "red" and "white" blood in peripheral blood smears; interpret their presence or absence in the blood.

Pathophysiology of systemic circulation and external respiration

Specific goals:

- Identify typical pathological conditions and disturbances in the circulatory system, circulatory failure; failure of the heart, cardiac arrhythmias; hypertension, hypotension; arteriosclerosis, atherosclerosis.
- Analyze and apply existing classification of typical violations in the circulatory system.
- Analyze changes in key parameters of cardio- and hemodynamics in heart failure (frequency and strength of heart rate, systolic and minute volume of blood, systolic, diastolic, and mean arterial pressure pulse blood, venous blood pressure).
- Analyze cause and effect relationships, to be able to separate pathological changes and adaptive-compensatory local and systemic in the pathogenesis of circulatory failure, heart failure, myocardial infarction, shock (cardiogenic shock).
- Explain the mechanisms of cardiac arrhythmias.
- Apply knowledge of common arrhythmia heart rate (violation of automatism, excitability, conductivity, combined) analysis electrocardiograms.
- To analyze the mechanisms of clinical manifestations of chronic heart failure and circulation.
- Analyze the causes and mechanisms of coronary disease, explain its possible consequences.
- Analyze the violation of the basic functions of the heart in acute coronary insufficiency.
- To characterize features of different forms of arteriosclerosis, modern theories to explain the pathogenesis of atherosclerosis.
- Use current criteria for the diagnosis of hypertension.
- Analyze the classification of hypertension.
- Apply knowledge of experimental modeling of secondary arterial hypertension (renal, endocrine, neurogenic) to analyze their pathogenesis.
- To treat primary hypertension as a multifactorial disease.
- Differentiate role change mechanism and volumetric flow in peripheral resistance of different options for hemodynamic hypertension.
- To analyze genetic defects as the basis of the pathogenesis of primary hypertension.
- explain the role of the kidneys in the pathogenesis of primary and secondary hypertension.
- Apply knowledge of experimental models of typical abnormalities in the circulatory system (coronary insufficiency, arteriosclerosis, hypertension) to analyze their pathogenesis.
- Explain the causes and mechanisms of hypotension.
- Analyze the causes and mechanisms of primary and secondary hypertension in a system of vessels of the pulmonary circulation.
- Identify of respiratory failure due to violation of the gas composition of blood, to know the criteria.
- Classification of respiratory failure on causes and mechanisms of development.
- characterize the causes of respiratory failure.
- Analyze the role of alveolar ventilation disorders, diffusion of gases across the alveolar-capillary membrane, perfusion in the pulmonary circulation in failure of the respiratory system.
- Explain the causes and mechanisms of restrictive and obstructive disorders of alveolar ventilation.
- To analyze causal relationships, while able to separate pathological changes and adaptive-compensation in the pathogenesis of respiratory failure.

- Explain the causes and pathogenesis of asphyxia.
- Explain the causes and mechanisms of breathlessness.
- To analyze the mechanisms of different types of terminal and periodic breathing.
- Do the findings of violations of ventilation (obstructive or restrictive) based on the analysis results.

Topic 29. Pathophysiology systemic circulation. Insufficiency of circulation.

Definition of circulatory failure, the principles of classification, characteristics and hemodynamic cardiovascular disorders. The concept of acute and chronic ("stagnant") circulatory failure. Etiology, pathogenesis, stages of chronic heart failure. Mechanisms of major clinical manifestations of chronic circulatory failure (dyspnea, cyanosis, edema).

Acute circulatory failure: etiology, pathogenesis, pathological changes and adaptive-compensatory. Collapse, shock options as state of acute circulatory failure.

Topic 30. Pathophysiology of heart insufficiency. Coronary insufficiency.

The definition of heart failure, the principles of classification.

Lack of heart because of overload. Reasons overload heart volume and resistance. Mechanisms of immediate and long-term adaptation of the heart to excessive load, tachycardia, hyper (hetero-, homeometric), myocardial hypertrophy. Hypertrophy of the heart: types, causes, mechanisms of development stages (FZ Meyersonom). Features hypertrophied myocardium, causes and mechanisms of its decompensation.

Myocardial form of heart failure.

Ishemic myocardial damage. Lack of coronary blood flow (relative and absolute, acute and chronic), mechanisms of development. The concept of "critical stenosis." The effects of myocardial ischemia, depression contractile activity, electrical instability, damage / necrosis cardiomyocytes additional damage during reperfusion. Coronary heart disease as a manifestation of coronary disease, its varieties. Clinical and laboratory criteria, manifestations and complications of myocardial infarction. Pathogenesis of cardiogenic shock. The principles of prevention and treatment of coronary heart disease.

Etiology and pathogenesis Non-Coronary myocardial damage. Cardiomyopathy. Classification. Characteristics of the causes and mechanisms of occurrence, clinical manifestations.

Cardiac arrhythmias: classification, causes, mechanisms, typical

electrocardiographic manifestations. The role of additional pathways in the development of heart arrhythmias. The causes and mechanisms of ectopic foci of excitation in the myocardium, mechanisms of re-entry and recycling of excitement. Fibrillation and defibrillation of the heart.

Extramiocardial heart failure. Defeat pericardium. Acute cardiac tamponade.

Principles cardioprotection and treatment of heart failure / circulation.

Topic 31. Pathophysiology of blood vessels.

The concept of vascular insufficiency. Types, causes and mechanisms of development.

Arteriosclerosis: definition, classification. The main forms of arteriosclerosis, atherosclerosis, their general characteristics (typical localization, manifestations, complications). Experimental modeling.

Experimental models.

Primary hypertension as a multifactorial disease: the role of hereditary factors and external factors in the development of primary hypertension. Theories of the pathogenesis of primary hypertension (Dysregulatory, membrane, etc.).

The mechanisms of primary and secondary hypertension, pulmonary circulation.

Hypotension: definition, criteria. Etiology and pathogenesis of acute and chronic arterial hypotension. Collapse. The causes and mechanisms of manifestations.

Topic 32. Pathophysiology of external breathing. Respiratory failure.

The definition of respiratory failure, criteria, principles of classification. Extra pulmonary abuse and pulmonary alveolar ventilation: central, neuromuscular, torakodiafragmal, reducing permeability air ways elastic properties of lung tissue, the number of functioning alveoli. Mechanisms abuse alveolar ventilation: Dysregulatory restrictive obstructive.

The causes and mechanisms of violations diffusion of gases in the lungs.

Violation of the pulmonary circulation. Violation of general and regional ventilation-perfusion relationships in the lungs.

Changes of the blood gas parameters and acid-base status at different types of respiratory failure, their importance to the body.

The pathogenesis of main clinical manifestations of respiratory insufficiency. Shortness of breath: types, causes and mechanisms of development.

Asphyxia, causes and mechanisms of development.

Violation no respiratory function of the lungs, their impact on systemic hemodynamics and hemostasis system.

Pathological breathing. Types terminal and periodic breathing.

Acute respiratory distress syndrom in SARS-Covid-19, types of respiratory insufficiency < mechanisms of development, complications.

Pathophysiology of digestive system, liver and kidneys.

- Identify common pathological conditions of the digestive system: lack of digestion (maldigestion) and malabsorption (malabsorption).

Apply different principles for the classification of the most common forms of lymphoma pathology of the digestive tract.

- Analyze the ulcer and / or duodenal ulcer as a multifactorial disease.
- characterize risk factors of gastric ulcer and / or duodenal ulcers.
- Use current understanding of the mechanisms of injury and defensive capabilities of the digestive tract to analyze its pathogenesis ulcers.
- Assess the importance of experimental modeling of various pathologies of the digestive canal to determine the causes and mechanisms of emergence and development.

Apply knowledge of the role of the nervous and humoral regulation of various gastrointestinal disorders channel analysis of motor, secretory and suction functions.

- Identify indicators of secretory function and apply them to the analysis of typical violations.
- Analyze the causes and mechanisms of pancreatitis.
- Analyze cause and effect relationships, to be able individual pathological changes and adaptive-compensatory local and systemic in the pathogenesis of pancreatic shock.
- To analyze the mechanisms of intestinal digestion disorders, states of maldigestion and malabsorption.
- Explain the pathogenesis of clinical manifestations of malabsorption syndrome;
- To analyze the clinical forms, causes and mechanisms of intestinal obstruction, explain its possible consequences and complications.

Pathophysiology of liver

- concept characterize, evaluate and apply criteria for classification of hepatic failure, hepatic coma, jaundice, portal hypertension.
- To analyze the different options for liver failure causes and mechanisms of occurrence, the nature of occurrence, severity.
- etiological factors characterize the emergence and development of liver failure, jaundice, portal hypertension.
- Explain the metabolic (metabolism of proteins, fats, carbohydrates, minerals, metabolism of xenobiotic) and hormonal changes in the body during liver failure.
- Apply the latest achievements of neurophysiology to explain the pathogenesis of encephalopathy and coma in hepatic insufficiency.
- Explain the mechanisms of jaundice.
- Analyze the reasons and mechanisms of development of the most important clinical syndromes with different types of jaundice.

Analyze the pathogenesis of portal hypertension, to explain the mechanisms of its main clinical manifestations.

Pathophysiology of kidney

- Analyze typical violations of quantitative and qualitative composition of urine.
- characterize the causes and mechanisms of violations processes glomerular filtration, tubular reabsorption and secretion.
- Understanding of renal clearance, be able to calculate and apply it to the analysis of the different parts of the nephron.
- To analyze the mechanisms of pathological proteinuria, explain which kidney disease may be associated with the development of individual species.
- Identify acute renal failure, its criteria, understand the principles of pathophysiological classification.
- Analyze the causes and mechanisms of prerenal, renal ,postrenal acute renal failure.
- Be able to explain the mechanism of reduction of glomerular filtration rate in different variants of acute renal failure.
- Assess the value of different approaches to the modeling of experimental acute diffuse glomerulonephritis in elucidating the causes and mechanisms of development.
- Identify nephrotic syndrome in his clinical and pathophysiological manifestations, explain the etiology of primary and secondary nephrotic syndrome.
- Treat acute tubular necrosis as an important cause of acute renal failure.
- Identify chronic renal failure (CRF), its criteria in terms of kidney function depending on the stage and clinical manifestations.
- characterize the causes and mechanisms of chronic renal failure.
- Analyze reactive changes of blood flow in the kidneys when they are damaged.
- Explain the metabolic (exchange of sodium and water exchange potassium, acid-base status, mineral metabolism, xenobiotic metabolism / drug) and endocrine changes in renal function during chronic renal failure.
- Assess the value retention of azotemia and other metabolic disorders in the development of multiple organ failure.
- Explain the general principles of prevention and treatment of acute and chronic renal failure.

Topic 33 Pathophysiology of the digestive system. Lack of digestion.

General lack of understanding of the digestive system, principles of classification. Reasons for failure of digestion (maldigestion). The role of nutritional and infectious agents, disorders of the nervous and humoral regulation of the functioning of the digestive system. How to digestive disorders with impaired metabolism and energy in the body.

Disorders of appetite. Anorexia.

The causes and mechanisms of digestive disorders in the oral cavity. Etiology, pathogenesis, experimental models of caries and periodontal disease. The causes, mechanisms and consequences of violations salivation.

Violation of motor function of the esophagus. Etiology, pathogenesis heartburn.

Indigestion in the stomach. Overview of disorders of motor and secretory functions of the stomach. Pathological gastric secretion, species; causes and mechanisms of development.

Etiology, pathogenesis of gastric ulcers and / or duodenal ulcers. The role of helicobacter pylory. The concept of symptomatic etiology and pathogenesis of gastric ulcers and / or duodenal ulcers.

Violation of digestion in the gut, etiology, pathogenesis. Digestive disorders associated with insufficient secretion of pancreatic juice. Etiology, pathogenesis, complications of acute and chronic pancreatitis. The pathogenesis of pancreatic shock.

Intestinal dyskinesia. The causes, mechanisms and symptoms of constipation and diarrhea. Intestinal obstruction: types, etiology, pathogenesis.

Violation of the barrier function of the intestines, intestinal autointoxication, coli sepsis, bacteria overgrowth.

Violation of the wall cavity and digestion in the intestines. Malabsorption syndrome: definition, manifestations (diarrhea, weight reduction, protein deficiency, vitamin deficiencies) causes and mechanisms of development. Intestinal enzymopathy.

Topic 34. Pathophysiology of the liver. Hepatic insufficiency.

Lack liver: definition, principles of classification. Etiology, pathogenesis, experimental models of liver failure. Typical carbohydrate, protein, lipid, water and electrolyte exchange, the exchange of microelements, vitamins and hormones, disruption of functional systems at the failure of the liver.

Lack antitoxic liver function, mechanism main manifestations. Types, Causes, pathogenesis of hepatic coma. Role cerebrotoxic substances.

Lack excretory liver function, key symptoms. The definition, criteria, types of jaundice, their causes and mechanisms. Comparative characteristics of pigmented disorders hemolytic metabolism, liver and jaundice; holemiyi and symptoms of hypo-, aholiya. Gallstone disease.

The syndrome of portal hypertension: etiology, pathogenesis, symptoms.

Mechanisms of ascites, hepatolienal and hepato-renal syndromes.

Topic 35. Pathophysiology of kidneys. Kidney failure.

The concept of the failure of the kidneys, the principles of classification. Prerenal actually real and postrenalni mechanisms of disorders of kidney processes. The causes and mechanisms of disorders of blood circulation in the kidneys. Functional and physical and chemical bases of disorders of glomerular filtration. The causes and mechanisms of violations tubular reabsorption and secretion. Hereditary tubulopatiyi. Key figures of the kidneys. Using functional tests to determine the type of renal function disorders.

Quantitative and qualitative changes in the composition of urine. Oliguria, anuria and polyuria. Water, osmotic diuresis and hypertensive. Hypo- and izostenuriya. Pathological components of urine: proteinuria, cylindruria, glucosuria, aminoaciduria, hematuria, leukocyturia. The concept of selective and nonselective proteinuria and its mechanisms.

Common manifestations of renal function insufficiency. The causes, manifestations and mechanisms of retention azotemia. The pathogenesis of renal edema. Violation of acid-base status, renal azotemic acidosis, proximal and distal tubular acidosis. The pathogenesis and manifestations of renal osteodystrophy. Mechanisms of hypertension, anemia, disorders of hemostasis in kidney damage.

Syndromes of acute and chronic renal failure, criteria, causes and mechanisms of development, clinical manifestations.

The pathogenesis of uremic coma. Principles of therapy of kidney failure. The concept of extracorporeal hemodialysis and peritoneal, limphodialysis.

Glomerulonephritis: definition, principles of classification. The experimental model, the current understanding of the etiology and pathogenesis of diffuse glomerulonephritis. Nephrotic syndrome, primary and secondary. Causes and mechanisms of kidney stones, urolithiasis.

Practical skills on the topic "Pathophysiology of digestion, liver and kidneys."

1. To carry out the analysis:

- Model disorders in the digestive system, liver, kidneys with defined concepts, criteria and principles of classification, manifestations and consequences.
- Cause-effect relationships in the pathogenesis of typical violations in the digestive system, liver and kidneys.
- peptic ulcer and / or duodenal ulcers in the context of general ideas about multifactorial disease.
- The causes and mechanisms of pancreatitis.
- causal relationships (pathological changes and adaptive-compensatory local and systemic) in the pathogenesis of pancreatic shock.
- A clinical options, the causes and mechanisms of intestinal obstruction and its possible consequences and complications.

2. Ability and practical skills:

- Solving situational problems with determining the causes, mechanisms and effects of typical violations in the digestive system, liver and kidneys.

- To make the scheme pigment disorders sharing the various types of jaundice.
- Identify indicators of gastric secretion and use them to analyze typical violations secretory function.
- Calculate the value of glomerular filtration by endogenous creatinine clearance, determine the intensity of tubular reabsorption of water and electrolytes and apply them to analyze disorders of the kidneys.
- Based on the results of laboratory tests to assess kidney function status, to determine the typical violations of quantitative and qualitative composition of urine.

Pathophysiology regulatory systems (endocrine, nervous) and extreme conditions

Specific goals

- Apply an overview of the endocrine function characteristics typical for disorders of the endocrine glands.
- Explain the causes and mechanisms of general primary and secondary endocrinopathy.
- characterize neuroendocrine pathology for the causes and mechanisms of development.
- Analyze the effects of hormone secretion disorders adenohipophysis.
- Analyze the effects of hormone secretion disorders Neurohipophysis.
- Explain the primary and secondary causes of hyper- and hipofunction adrenal glands.
- Analyze the pathogenesis of metabolic and physiological functions in hyper- and hypothyroidism adrenal glands.
- Explain the mechanisms of hereditary disorders caused by adrenal function.
- Explain the causes, mechanisms and manifestations of hyper- and hypothyroidism thyroid gland.
- Define the term "crop", analyze the types of crop for the etiology, pathogenesis and thyroid function.
- Analyze the causes and typical violations in the body in hypo- and hyperfunction parathyroid gland. To analyze the causes and mechanisms of disorders of the reproductive system.

Explain typical state failure gonads disorders in men and women.

- Explain the role of stress, its causes and mechanisms of development, have an understanding of "diseases of adaptation."

To analyze the general principles of diagnosis and treatment of disorders of the endocrine glands.

- Identify typical violations of the nervous system.
- To apply different principles for classification / characteristics disorders of the nervous system.
- Explain the peculiarities of typical pathological processes at their location in the central nervous system.

Apply knowledge of the causes and mechanisms sensitivity disorders of the nervous system in the development somatovisceral pathology.

To analyze the types of pain, to understand the modern theory of the pathogenesis of pain.

- Analyze manifestations, causes, mechanisms of motor disorders of the nervous system.
- Know the causes and mechanisms of disorders of the autonomic nervous system.
- Apply knowledge of the causes and mechanisms of disorders of the nervous trophic system to analyze the pathogenesis of neurogenic dystrophies.
- Apply knowledge of the causes and mechanisms of cell damage analysis of structural and functional abnormalities of neurons and their consequences.
- Analyze the role of acute and chronic disorders of cerebral circulation in disorders of the brain and body as a whole.
- Assess the importance of age-related changes in functioning of nervous system disorders.
- Explain the nature of the disturbances of the nervous system caused by genetic defects.
- Explain mechanisms of development and the main manifestations of integrative disorders of the central nervous system based on knowledge of the general laws of its functioning.
- Define the term "extreme conditions" shock / collapse, coma.
- Explain the principles of classification shock and coma.
- Analyze the causes and mechanisms of extreme conditions.
- Explain the principles of treatment of extreme conditions.

Topic 36. Pathophysiology of the endocrine system.

Overview of disorders of the endocrine system: hypofunction, hyper dysfunction glands; primary, secondary endocrinopathies. Causes and mechanisms of endokrynopatiy. Dysregulator endocrinopathies: disorders of the nervous, neuroendocrine, metabolic and endocrine regulation of endocrine glands. Violations of direct and inverse regulatory relationships.

Glandular endocrinopathies: causes and mechanisms of disorders of synthesis and secretion of hormones deposit.

Peripheral disorders of the endocrine function. Violations of transport and metabolic inactivation of hormones. Violation of reception of hormones and hormonal mechanisms desensibilisation resistance (prereceptor, receptor, postreceptor).

Pathology of the hypothalamic-pituitary system. Causes and mechanisms of syndromes of excess and deficiency of pituitary hormones. Overview of disorders of the hypothalamic-thyroid hipophizis-, hypothalamic-pituitary-adrenal, hypothalamic-gonadal hypophizis- systems. Etiology, pathogenesis, clinical manifestations panhipopituitaryzm. The causes, mechanisms, clinical manifestations of partial failure adenohipophysis hormones (GH, TSH, ACTH, gonadotropins).

Neurohipophysis Pathophysiology. Diabetes insipidus: Causes and mechanisms of development, clinical manifestations.

Pathology of the adrenal glands. Adrenal insufficiency: types (primary, secondary, acute, chronic), etiology, pathogenesis, clinical manifestations. Hyperfunction adrenal cortex: types (primary, secondary), etiology, pathogenesis, clinical manifestations. Cushing Syndrome, Connie, hyperplasia congenital adrenal (adrenogenital syndrome). Types, causes, mechanisms of development, clinical manifestations of disorders of the adrenal medulla.

Thyroid cancer. Hypothyroidism: causes and mechanisms of pathogenesis major disturbances in the body. Hyperthyroidism: Causes and mechanisms of pathogenesis major disturbances in the body. Goiter: species (endemic, sporadic, toxic nodular and diffuse), their etiology and pathogenesis; description of violations of the functional state cancer.

Impaired function of parathyroid gland: types, causes, mechanisms of development, clinical and pathophysiological manifestations.

Violation of the sex glands: primary and secondary hypogonadism and hyper states. The causes and mechanisms of development, extragenital manifestations dysfunction gonads.

Endocrine pancreatic function (see. Section "Pathology of carbohydrate metabolism").

Pathology epiphysis, hypo- and hyperfunction, the main manifestation.

The principles of diagnosis and treatment of pathologies of the endocrine glands.

The concept of stress as a nonspecific, stereotypical adaptive response of the body to effect emergency stimuli. Stages of the general adaptation syndrome. Mechanisms of long-term adaptation. The concept of stress and injuries "diseases of adaptation." The principles of preventing stress injury.

Topic 37. Pathophysiology of nervous system.

Overview of the pathology of the nervous system, the principles of classification of violations of its activities. Features of typical pathological processes in the nervous system.

Violation of sensory functions of the nervous system. Motor- disorders, thermal, proprio- and nociception. Violation of sensory information. Brown-Sekara syndrome. Manifestations damage thalamic sensory centers and structures of the cerebral cortex.

Pain. Features of pain as a form of sensitivity. Principles of classification of pain. Somatic pain. Visceral pain. Modern ideas about the causes and pathogenesis of pain: the theory of separation of pulses ("Portal Theory") theory

specificity. Pathological pain, neuralgia, causalgia, phantom,

thalamic. Peripheral, peripheral-central and central mechanisms of pathological pain. Emotional, autonomic, motor reactions to pain. Emotional stress, pain, painful shock. Natural antinociceptive mechanisms. Principles and methods of analgesic therapy.

Violation of motor function of the nervous system. Experimental modeling of movement disorders. Peripheral and central paresis and paralysis: Causes, mechanisms of development, the main manifestations. Spinal shock. Motor abuse subcortical origin. Violations associated with damage to the cerebellum. Seizures their views. Violation of neuromuscular transmission. Myasthenia.

Violation of the autonomic functions of the nervous system, methods of experimental design. Vascular dystonic syndrome.

Violation of trophic function of the nervous system. Neurogenic dystrophy. Etiology, pathogenesis.

Violation of integrative functions of the central nervous system (CNS). The causes and mechanisms of violations of electrophysiological processes in neurons. Violation of ion channels. The causes and mechanisms of violations neurochemical processes. Exchange violation neurotransmitter, neuromodulator, neurohormones. Pathological excitation and pathological inhibition of the nerve centers. Neuroses.

Damage to neurons as one of the causes of violations integrative functions of the CNS.

Acute and chronic disorders of cerebral circulation, stroke. Edema and swelling of the brain, causes and mechanisms of development. Intracranial hypertension. The role of glia in the injury of pathological processes in the central nervous system. Damage to the blood-brain barrier and autoimmune brain damage.

Topic 38. Pathophysiology extreme states.

The concept of extreme conditions.

Shock: types, clinical manifestations, causes and mechanisms of development.

Violation of general hemodynamics and microcirculation in the pathogenesis of shock. Stages of shock. The role of hormones and physiologically active substances and products of tissue damage in the pathogenesis of shock. The concept of "shock organs". Participation neural mechanisms of shock. The pathophysiological bases of prevention and treatment of shock.

The concept of the crash syndrome. Causes, mechanisms of development, manifestations.

Collapse. Common and distinctive signs of shock and collapse. The causes and mechanisms of collapse states.

Coma. Principles of classification. The causes and mechanisms of coma. The role of energy brain disorders, disorders osmotic, ion and acid-base homeostasis in the pathogenesis of coma. Principles of therapy places

3. STRUCTURE OF PATHOPHYSIOLOGY

Theme	Lectures	Practical classes	Independent	Individual work
Mini module 1. General nosology				
Theme1. Subject of pathophysiology, its objectives and methods used in pathophysiology. Role of experimental method for pathology. Etiology and pathogenesis		1	1	-
Theme2. Study about diseases. Etiology .Pathogenesis		1	1	
Theme 3. Pathogenic influence of physical factors.		4	8	
Theme 4 Pathogenic influence of chemical factors.			4	
Theme 5. Pathogenic influence of biological factors.			2	
Theme 6. The role of heredity and constitution in pathology	1	2	4	
Theme 7. Pathophysiology of immunologic reactivity. Concept of immunodeficiency.	1	2	3	
Theme 8. Allergy, allergic reactions .	2	2	3	
Theme 9. Mini module 1: general nosology.		2	3	
Current points(together with1 mini-module)	4	14	29	
Mimi module 2. Typical pathological process”.				
Theme 10. Pathology of cell. Cell injury	2	2	2	-
Theme 11. Disorders of the peripheral circulation and microcirculation .	-	2	2	
Theme 12. Inflammation	2	2	2	
Theme 13. Fever.	-	2	2	
Theme 14 . Tumors	2	2	3	
Theme 15. Starvation..		1	2	
Theme 16 Hypoxia				
Theme 17. Mini module 2: Typical pathological process		1	3	
Current points(together with2 mini-module)	6	12	16	
Mini module 3. Typical metabolic disorders.				
Theme 18. Energy metabolic disorders			2	-
Theme 19 Carbohydrate metabolism disorders.	2	2	2	
Theme 20. Lipid metabolism disorders.			2	
Theme 21. Proteins metabolism disorders. Disorders of purine metabolism and pyrimidine bases pathology.			2	
Theme 22. Vitamins metabolic disorders.			2	
Theme 23. Water and electrolytic metabolism disorders.	2	2	3	
Theme 24. Acid-base balance disorders.	2	2	2	
Theme 25. Mini module: Typical metabolic disorders				
Current points(together with3 mini-module)	6	6	15	
Final control				credite
Mini module 4. Pathology of blood.				
Theme 26. Quantitative and qualitative changes of erythrocytes. Anemia: classification of anemias. Posthemorrhagic anemias.	1	2,5	3	-
Theme 27 Aetiology and pathogenesis of hemolytic anemias and anemias of diminished erythropoiesis	1	2,5	3	
Theme 28 White blood cell disorders: leukocytosis, leukopenia.	1	2,5	3	
Theme 29 Leukemia.	1	2,5	3	
Theme30 Disorders of physicochemical properties of		2,5	3	

the blood and the haemostasis system.				
Theme 31. Mini module Pathology of blood		2,5	3	
<i>Current points(together with4 mini-module)</i>	4	12,5	15	
Mini module 5. Pathology of hemodynamic disorders and external respiration.				
Theme32 Haemodynamic disorders. Heart failure.	1	2,5	3	-
Theme 33. Pathology of hart. Insufficiency of coronary arteries.				
Theme 34Pathology of vessels	1	2,5	3	
Theme 35. Pathophysiology of the upper respiratory airways disorders. Respiratory failure. Hypoxia	2	2,5	3	
<i>Current points(together with5 mini-module)</i>	4	7,5	9	
Mini module 6. Pathology of digestive, liver and kidneys system				
Theme 36. Pathophysiology of the digestive system. Failure digestive system.	1	2,5	3	-
Theme 37. Pathology of the liver. Liver insufficiency.	1	2,5	3	
Theme 38. Pathophysiology of the kidneys	2	2,5	3	
Theme 39 Mini module 6. Pathology of digestive, liver and kidneys system		2,5	3	
<i>Current points(together with6 mini-module)</i>	4	10	12	
Mini module 7. Pathology of the regulative system				
Theme 40. Aetiology and pathogenesis of endocrine system disorders: pathophysiology of hypothalamus and pituitary gland diseases.	2	2,5	3	-
Theme 41. Pathophysiology of nervous system.	2	2,5	4	
Theme 42 Exstremal states	2	3	3	
<i>Current points(together with7 mini-module)</i>	6	8	10	
<i>Together hours 210/7 credits ECTS</i>	34	70	106	
<i>Final control</i>				Exam

Classes work -49,5%,independent work – 50,5%

4. THEMATIC PLAN OF LECTURES

№	Theme	hour
Mini module 1. General nosology		
1	Roll hereditary and constitution. Pathology of reactivity	2
1.	Pathophysiology of immunologic reactivity. Concept of immunodeficiency Allergy, allergic reactions. Role of cytokines in SARS COVID-19 development.	2
Together		4
Mini module 2. Typical pathological process		
2.	Pathophysiology of cell injury	2
3.	Inflammation. Mediators inflammation. Pecularity of inflammatory response in SARS- Covid 19.	2
4.	Neoplasia. Principles classification	2
Together		6
Mini module3 Pathology of metabolic disorder		
5.	Carbohydrate metabolism disorders. Diabetes mellitus, complications.	2
6.	Acid-base balance disorders..	2
7.	Water-electrolyte balance	2
Together:		6
Mini module 4. Pathology of blood		
8.	Pathology of blood. Anemia: method classification , etiology, pathogenesis.	2
9.	White blood cell disorders. Leukemia: method classification , etiology, pathogenesis.	2
Together:		4
Mini module 5. . Pathology of hemodynamic disorders and external respiration.		
10.	Pathophysiology of cardiovascular system. Hemodynamics disorders. Hypertensions: types, etiology, pathogenesis. Myocardial infarction and atherosclerosis: aetiology, pathogenesis	2
11.	Pathophysiology of the upper respiratory airways disorders. Respiratory failure. Disorders of alveolar ventilation, diffusion, and perfusion. Hypoxia . Side effects of SARS COVID-19 on the respiratory function .	2
Together:		4
Mini module 6. Pathology of digestive, liver and kidneys system		
12.	Pathophysiology of gastro-intestinal system and liver. Disorders of secretory and motile function of digestive tract. Digestive disorders associated with secretory insufficiency of the pancreas. Hepatic failure..	2
13.	Pathophysiology of kidneys. Causes and mechanisms of disorders of glomerular filtration, tubular reabsorption and secretion. Acute and chronic renal failure: criteria, causes, mechanisms, general manifestations.	2
Together:		4
Mini module 7. Pathology of the regulative system		
14.	Aetiology and pathogenesis of endocrine system disorders: pathophysiology of hypothalamus and pituitary gland diseases.	2
15.	Pathophysiology of CNS	2
16.	Extremal states	2
Together:		6
Number hours of lectures		34

5.THEMATIC PLAN OF PRACTICAL CLASSES

№	Theme	hours
Mini module 1: General nosology		
1.	Subject of pathophysiology, its objectives and methods used in pathophysiology. Role of experimental method for pathology. Etiology and pathogenesis.	2
2.	Pathogenic influence of abnormal atmospheric pressure on the organism.	2
3.	Pathogenic influence of ionizing radiation on the organism.	2
4.	The role of heredity and constitution in pathology.	2
5.	The pathology of reactivity. Immunological reactivity disorders. Role of cytokines in SARS COVID-19 development.	2
6.	Allergy.	2
7.	Cell injury	2
Together:		14
Mini module 2: Typical pathological process		
8.	Disorders of the peripheral circulation and microcirculation ..	2
9.	Inflammation. Pecularity of inflammatory response in SARS- Covid 19.	2
10.	Fever.	2
11.	Neoplasia.	2
12.	Starvation	1
13.	Hypoxia	
14.	Mini module 2: Typical pathological process	1
Together:		10
Mini module 3. Typical metabolic disorders.		
15.	Carbohydrate metabolism disorders..	2
16.	Water and electrolytic metabolism disorders.	2
17.	Acid-base metabolic disorders.	2
18.	Mini module 3. Typical metabolic disorders .	-
Together:		6
Mini module 4 Pathology of blood:		
19.	Quantitative and qualitative changes of erythrocytes. Anemia: classification of anemias. Posthemorrhagic anemias	2,5
20.	Aetiology and pathogenesis of hemolytic anemias and anemias of diminished erythropoiesis	2,5
21.	White blood cell disorders: leukocytosis, leukopenia. Leukemia.	2,5
22.	Disorders of physicochemical properties of the blood and the haemostasis system. Trombophilic s-m after Covid	2,5
23.	Mini module 4 Pathology of blood	2,5
Together:		12,5
Mini module 5: Pathology of hemodynamic disorders and external respiration.		
24.	Haemodynamic disorders. Heart failure. Pathology of hart. Insufficiency of coronary arteries.	2,5

25.	Pathology of vessels	2,5
26.	Pathophysiology of the upper respiratory airways disorders. Respiratory failure. Hypoxia	2,5
	Together:	7,5
	Mini module 6. Pathology of digestive, liver and kidneys system	
27.	Pathophysiology of the digestive system. Failure digestive system.	2,5
28.	Pathology of the liver. Liver insufficiency.	2,5
29.	Pathophysiology of the kidneys	2,5
30.	Mini module 6. Pathology of digestive, liver and kidneys system	2,5
	Together:	10
	Mini module 7 Pathology of the regulative system	
31.	Etiology and pathogenesis of endocrine system disorders: central gland	2,5
32.	Pathology of central nervous system .	2,5
33.	Extremal states	3
	Together:	8
	Numbers hours of practical classes	70

6. THEMATIC PLAN OF STUDENTS' INDEPENDENT WORK

№	Theme	Hours/84	Type of control
	Mini module 1 General nosology		
1.	Subject of pathophysiology, its objectives and methods used in pathophysiology. Role of experimental method for pathology Study about desiases. Etiology and pathogenesis.	2	Current control on the practical classes
2.	Pathogenic influence of barometric pressure	2	
3.	Pathogenic influence of ionizing radiation .	2	
4.	Hereditary and constitution	2	
5.	Pathophysiology of immunologic reactivity. Concept of immunodeficiency.	3	
6.	Allergy, allergic reactions .	3	
7.	Mini module 1 General nosology	3	
	Together	17	
	Mimi module 2. Typical pathological process.		
8.	Disorders of the peripheral circulation and microcirculation.	2	
9.	Inflammation	2	
10.	Fever.	2	
11.	Tumors	3	
12.	Starvation.	2	
13.	Mimi module 2. Typical pathological process.	3	
	Together	14	

	Mini module 3. Typical metabolic disorders.		
14.	Carbohydrate metabolism disorders.	2	
15.	Water and electrolytic metabolism disorders.	3	
16.	Acid-base balance disorders.	2	
17.	Mini module 3: Typical metabolic disorders	2	
	Together	7	
	Mini module 4. Pathology of blood.		
18.	Quantitative and qualitative changes of erythrocytes. Anemia: classification of anemias. Posthemorrhagic anemias.	3	Current control on the practical classes
19.	Aetiology and pathogenesis of hemolytic anemias and anemias of diminished erythropoiesis	3	
20.	White blood cell disorders: leukocytosis, leukopenia. Leukemia.	3	
21.	Disorders of physicochemical properties of the blood and the haemostasis system. Trombophilic syndrome in SARS-Covid 19.	3	
22.	Mini module Pathology of blood	3	
	Together	15	
	Mini module 5. Pathology of hemodynamic disorders and external respiration.		
23.	Haemodynamic disorders. Heart failure. Pathology of hart. Insufficiency of coronary arteries	3	Current control on the practical classes
24.	Pathology of vessels	3	
25.	Pathophysiology of the upper respiratory airways disorders. Respiratory failure Hypoxia. Side effects of SARS COVID-19 on the respiratory function .	3	
	Together	9	
	Mini module 6. Pathology of digestive, liver and kidneys system		
26.	Pathophysiology of the digestive system. Failure digestive system.	3	Current control on the practical classes
27.	Pathology of the liver. Liver insufficiency.	3	
28.	Pathophysiology of the kidneys	3	
29.	Mini module 6. Pathology of digestive, liver and kidneys system	3	
	Together	12	
	Mini module 7. Pathology of the regulative system		
30.	Aetiology and pathogenesis of endocrine system disorders: pathophysiology of hypothalamus and pituitary gland diseases.	3	-<<-
31.	Pathophysiology of nervous system.	4	
32.	Extremal states	3	
	Together	10	
	Together IW	106	
	Time from extra class practice	22	
	Mini module 1		
1	<i>Pathological influence of ultraviolet</i>	2	
2	<i>Pathogenic effect of electricity</i>	2	
3	<i>Negative effect of intoxication and chemical agents</i>	2	
4	<i>Pathogenic mechanisms of alcohol, narcotics and nicotine</i>	2	
5	<i>Aging and disease. Courses, manifestation, complication</i>	2	
6	<i>Infection processes and their mechanisms formation</i>	2	
	Together	12	
	Mini module 2		

5	<i>Pathophysiology of cell. Cell injury</i>	2	
	<i>Together</i>	2	
	<i>Mini module 3</i>		
	<i>Pathology of cells metabolic, energy and respiratory processes</i>	2	
	<i>Pathology of lipid metabolism</i>	2	
	<i>Pathology of protein metabolism</i>	2	
	<i>Vitamins disorders</i>	2	
	<i>Together</i>	8	
	<i>Total amount</i>	106	

7. Independent task: -

8. Studing methods:

During the study of the discipline the following teaching methods are used: explanatory-illustrative, reproductive and research methods.

Comprehensive methodological support of the educational process includes a system of educational and methodological documentation and teaching aids, which include curricula, programs, equipment of classrooms, textbooks and manuals, instructions for independent work of students in preparation for practical classes, as well as guidelines for independent extracurricular development topics from the discipline

9. Methods of control:

Method of oral control. Oral control is carried out by individual and face-to-face interviews.

Method of written control. Carried out with the help of tests, written content modules, which can be short-term (15-20 minutes) and throughout the lesson.

Method of written control. Carried out with the help of tests, written content modules, which can be short-term (15-20 minutes) and throughout the lesson.

The method of laboratory control is aimed at testing students' ability to use the equipment for practical work used in the classroom. The control practical works also include the solution of situational problems.

Test control method. At the heart of such control are tests - special tasks, the performance (or non-performance) of which indicates the presence (or absence) of students of certain knowledge and skills.

Method of self-control. It involves the formation of students' ability to independently control the degree of assimilation of educational material, to find mistakes, inaccuracies, to determine ways to eliminate them.

10. The current control is carried out during the training sessions and aims to check the assimilation of educational material by students. Current control during training sessions involves oral questioning, solving situational and test tasks.

Evaluation of current educational activities. During the assessment of mastering each topic for the current educational activity of the student, grades are set on a 4-point (traditional) scale, taking into account the approved assessment criteria. This takes into account all types of work provided by the curriculum. The student must receive a grade on each topic. Forms of assessment of current educational activities are standardized and include control of theoretical and practical training. The student must receive a grade from each topic for further conversion of grades into points on a multi-point scale.

Criteria for evaluating current performance on practical class III year students of the Dentistry Faculty

Oral answer (mark)	Situation task (mark)	MCQ	
		№ answers	mark
5	5	19-20	5
4	4	17-18	4
3	3	15-16	3
2	2	14 i<	2

Evaluation oral answer:

5 – full answer and correct

4 – incomplete answer , correct questions

3 – answer incomplete with errors one question

2 – No answer

In the study of subjects in the first semester final form control is offset.

The maximum number of points that a student can collect for current educational activity at the study subjects is 200 points.

The minimum number of points that a student must collect for current educational activity for enrollment courses is 120 points.

n the study of subjects in the second semester of the final form of control is the exam:

The maximum number of points that a student can collect for current educational activity per semester for admission to the exam is 120 points.

The minimum number of points that a student must collect for current educational activity per semester for admission to the exam is 72 points.

Independent work of students is evaluated during the current control of theme on the appropriate lesson. Mastering of themes which dart out only on independent work is controlled at the final control. Semester exam - a form of final control of the student theoretical and practical material on separate discipline semester, carried out as a control measure.

Student considered to be admitted to the semester exam with discipline if he visited all the prescribed curriculum with courses for classroom training sessions, met all kinds of work envisaged working program of discipline and when it came into the study during the semester score not less than the minimum (72 points). The maximum number of points that a student can get in the preparation of the exam is 80. The minimum number of points in the preparation of the exam - at least 50.

11. Terms of final control(offline form)

Final control consists of the following stages:

Stage 1 - a written response to the tests of format (blank control). The student is responsible for 25 tests format of the themes of each semantic module, which are part of the final module.

Phase II - a written response. The student is responsible for 5 theoretical issues in ticket

Phase II - a written response. Demonstration of practical skills complite caseses .

Evaluation situation task:

5 – correct answers to all full question

4 – full correct answers on the two

3 – full correct answers on the

2 – No answer

Final control						
MCQ control	Written controle					Demonstration of practical skills
	Open questions					
	1	2	3	4	5	
«5» 23-25 points (91-100% correct answers)	«5» 10 points	«5» 10 points	«5» 10points	«5» 10points	«5» 10 points	«5» 5 points
«4» 18-22 points (71-90% correct answers)	«4» 8 points	«4» 8 points	«4» 8 points	«4» 8 points	«4» 8 points	«4» 4-3 points
«3» 13-17 points (50-70% correct answers)	«3» 7 points	«3» 7 points	«3» 7 points	«3» 7 points	«3» 7 points	«3» 2-1 points
«2» 0 points (less 50% correct answers)	«2» 0 points	«2» 0 points	«2» 0points	«2» 0 points	«2» 0 points	«2» 0 points

Determination of the number of points that a student collected from discipline.

Assessment of the discipline, culminating exam is defined as the total score of points for current educational activity (at least 72) and points for the exam (at least 50).

Scores of discipline for students who completed the program successfully converted a traditional 4-point scale by absolute criteria, which are listed in the table below:

(Points) Score 4-point scale	(Points) Score 4-point scale
From 170 till 200 points	5
From 140 till 169 points	4
From 139 till min.	3
Less than min. points	2

ASSESSMENT CRITERIA FOR THE EXAMINATION ON THE SUBJECT “PATHOLOGICAL PHYSIOLOGY”

(online examination)

Maximal possible amount of points for the examination is 80.

Minimal amount of points for the examination to be considered passed is 50.

Final mark for a subject that is concluded with an examination is a sum of points for the three semesters (not less than 72) and examination points (not less than 50).

Total points for a subject Mark according to the 4 points scale

170 - 200 points 5

140 - 169 points 4

139 points 3

122 (minimal required amount of points) -

Less than minimal required amount of points 2

Final assessment is conducted in the form of a computer-based examination that includes 80 multiply choice questions (MCQs) that correspond to the topics of the curriculum.

Assessment criteria for the examination:

1 correctly answered multiply choice question equals 1 point (maximal possible amount of points is 80)

MCQs according to the complexity level:

1) 40 MCQs of the first complexity level that have five options, one of which is correct (one correct answer = 1 point);

2) 40 MCQs of the second complexity level: that have (in example)six options or more, In example :three of which are correct; each correct option equals 0.3333 points (1 correct answer = 0.3333 points, 2 correct answers = 0.6666 points, 3 correct answers = 1 point, but if one of the

incorrect options is chosen, the whole question is marked as 0 points regardless of the other options chosen);

Note: please remember that even one incorrect option chosen alongside one (or two) correct ones will result in the whole question being marked as 0 points

13. Methodical guide

1. Регада М.С. та інші. Methodical recommendations for independent work of English-speaking students of medical faculty for preparation to practical classes on the theme "Typical pathological processes"
2. Регада М.С. та інші. Methodical recommendations for independent work of English-speaking students of medical faculty for preparation to practical classes on the theme "General nosology"
3. Регада М.С. та інші. Methodical recommendations for independent work of English-speaking students of medical faculty for preparation to practical classes on the theme "Red blood cell disorders"
4. Регада М.С. та інші. Methodical recommendations for independent work of English-speaking students of medical faculty for preparation to practical classes on the theme "Typical metabolic processes"
5. Регада М.С. та інші. Methodical recommendations for independent work of English-speaking students of medical faculty for preparation to practical classes on the theme "Leukoses"
6. Регада М.С. та інші. Methodical recommendations for independent work of English-speaking students of medical faculty for preparation to practical classes on the theme "Leukocytoses. Leukopenias"
7. Регада М.С. та інші. Methodical recommendations for independent work of English-speaking students of medical faculty for preparation to practical classes on the theme "Disorders of the system of hemostasis"
8. Регада М.С. та інші. Methodical recommendations for independent work of English-speaking students of medical faculty for preparation to practical classes on the theme "Hematologic disorders of white blood cells"
9. Регада М.С. та інші. Methodical recommendations for independent work of English-speaking students of medical faculty for preparation to practical classes on the theme "Insufficiency of blood circulation"
10. Регада М.С., Семенців Н.Г., Колішецька М.А., Качмарська М.О., Байда М.Л. Methodical guide for English-speaking students 3rd – year in studying of General medicine in practical training on the theme «Pathophysiology of endocrine system»
11. Регада М.С., Колішецька М.А., Семенців Н.Г., Байда М.Л., Садляк О.В. Methodical guide for English-speaking students 3rd – year in studying of General medicine in practical training on the theme «Pathophysiology of nervous system»
12. Регада М.С., Колішецька М.А., Семенців Н.Г., Байда М.Л. Methodical guide for English-speaking students 3rd – year in studying of General medicine in practical training on the theme «Pathophysiology of the extreme states»
13. Регада М.С., Колішецька М.А., Семенців Н.Г., Байда М.Л., Садляк О.В. Methodical guide for English-speaking students 3rd – year in studying of General medicine in practical training on the theme «Renal pathophysiology. Renal insufficiency»
14. Регада М.С., Семенців Н.Г., Колішецька М.А., Качмарська М.О., Байда М.Л. Methodical guide for English-speaking students 3rd – year in studying of General medicine in practical training on the theme «Pathophysiology of liver. Hepatic insufficiency»
15. Регада М.С., Семенців Н.Г., Колішецька М.А., Качмарська М.О., Байда М.Л. Methodical guide for English-speaking students 3rd – year in studying of General medicine in practical training on the theme «Pathophysiology of the digestive system. Insufficiency of digestion»

16. Переда М.С., Колішецька М.А., Семенців Н.Г., Байда М.Л., Качмарська М.О.,
Methodical guide for English-speaking students 3rd – year in studying of General medicine
in practical training on the theme «Hypoxia»

14. Bases literature

1. General and clinical pathophysiology : textbook for students of higher educational institutions, of IV th level of accreditation / A. V. Kubyshkin [et al.] ; ed. by.: A. V. Kubyshkin, A. I. Gozhenko ; рец.: N. V. Krishtal, N. K. Kazimirko. – 3rd ed. - Vinnytsya : Nova Knyha Publishers, 2019. - 656 p.
2. Pathophysiology=Патофізіологія : підручник для мед. ВНЗ IV р. а. Затверджено МОН / за ред. М.В. Кришталя, В.А. Міхньова. - Київ : Медицина, 2017. - 656 с.
3. Simeonova N. K. Pathophysiology=Патофізіологія : textbook for students of higher medical educational institutions of the III-IV accreditation levels / N. K. Simeonova ; ed. by V. A. Mikhnev. – 3rd ed. - Kyiv : AUS Medicine Publishing, 2017. - 544 p.

Additional literature:

1. Damjanov, Ivan. Pathophysiology : textbook / I. Damjanov. - 1st ed. - Philadelphia : Elsevier, 2009. - 464 p.
2. Kumar V. Robbins and Cotran Pathologic Basis of Disease. Vol. I / V. Kumar, A. K. Abbas, J. C. Aster. - India : Elsevier, 2014. - 1391 p.
3. Kumar V. Robbins and Cotran Pathologic Basis of Disease. Vol. I / V. Kumar, A. K. Abbas, J. C. Aster. - India : Elsevier, 2015. - 1391 p.
4. Mohan Harsh. Textbook of pathology. - - 6 th ed. - New Delhi : Jaypee Brothers Medical Publishers Ltd., 2010. - 933 p.
5. Pathophysiology : The Biologic Basis of Disease in Adults and Children / ed. by K. L. McCance, S.E. Huether. - 7th ed. - Mosby, 2014. - 1840 p.
6. Porth C. M. Pathophysiology : Concepts of Altered Health States. - Lippincott Williams & Wilkins; Seventh Edition USA. - 2004. - 1616 p.
7. Simeonova N. K. Pathophysiology=Патофізіологія : textbook for students of higher medical educational institutions of the III-IV accreditation levels / N. K. Simeonova ; ed. by V. A. Mikhnev. - 2nd ed. - Kyiv : AUS Medicine Publishing, 2015. - 544 p.

15. Source of internet information:

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www.medicalstudent.com
www.puthguy.com
www.bloodline.net
www.tdmu.edu.ua
<http://libr.krmu.kharkov.ua>
<http://www.librare.gov.ua>
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<https://nmapo.edu.ua>
<http://www.medbioworld.com>
<http://roar.eprints.org/>
<http://www.sciencekomm.at/>
<http://testcentr.org.ua/>

ADDITION

Syndromes and symptoms:

1. anemia
2. atrophy
3. heart pain
4. abdominal pain
5. loss of consciousness
6. hemorrhagic s-m
7. hyperesthesia
8. hypersalivation
9. head pain
10. jaundice
11. asphyxia
12. vertigo
13. fever
14. lymphadenopathy
15. cerebral s-m
16. edema
17. paresis, paralysis

Blood pathology:

1. anemia
2. hemophilia
3. leukemia
4. thrombocytopathy

Cardio-vascular d-s:

1. hypertension
2. heart d-ss
3. cardiac insufficiency
4. cardiac pathology

Respiratory d-s:

1. Asthma

Endocrine d-s:

1. diabetes mellitus
2. glands pathology

Extremal state:

1. coma
2. crisis hypertensive
3. acute cardiac insufficiency
4. acute respiratory insufficiency
5. blood loss
6. collapse
7. shock

Laboratory test:

3. Level of glucose in blood

6. Blood test
7. Urinary test
8. Biochemical blood test
9. Coagulogram

Associate Professor, MD, Ph.D.

Sementsiv N.G.

